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DEPARTMENT OF FISH AND GAME

Jerry M. Cooley, Director

FEDERAL AID IN FISH AND WILDLIFE RESTORATION

Job Performance Report

Project F-71-R-13

REGIONAL FISHERIES MANAGEMENT INVESTIGATIONS

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By

James R. Lukens, Regional Fishery Manager
James A. Davis, Regional Fishery Biologist

December 1989

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JOB PERFORMANCE REPORT

STATE OF: Idaho

NAME: REGIONAL FISHERY MANAGEMENT INVESTIGATIONS

PROJECT NO.: F-71-R-13

TITLE: Salmon Subregion Mountain Lake Investigations

JOB NO: 6(SAL)-a

PERIOD COVERED: July 1, 1988 to June 30, 1989

ABSTRACT

This year no mountain lakes were surveyed. We planted 109 mountain lakes in the Sawtooth National Recreation Area (Table 1) and the western half of the Challis National Forest (Table 2). A Hughes 500 helicopter was used to plant the fry at a total cost of $2,771.00, or $25.42 per lake.

Authors:

James A. Davis
Regional Fishery Biologist

James R. Lukens
Regional Fishery Manager

Table 1. Sawtooth National Recreation Area mountain lake fry plants, 1988.

Lake name	Number stocked	Species[a]
Hidden Lake	250	CT
Elizabeth Lake	500	CT
Hanson Lake #1	500	CT
Hanson Lake #3	1,000	CT
Hanson Lake #5	250	CT
McGowan Lake #1	500	RB.
McGowan Lake #2	500	RB
Iron Creek Lake #7	500	RB
Goat Creek Lake #6	250	CT
Goat Creek Lake #5	250	CT
Goat Creek Lake #4	250	CT
Goat Creek Lake #1	1,000	CT
Marshall Lake #2	500	CT
Thompson Cirque Lake	750	CT
Fishhook Creek #2	250	CT
Fishhook Creek #3	500	CT
Stephens Lake	500	CT
Upper Redfish Lake #2	500	CT
Upper Redfish Lake #1	1,000	GR
Upper Cramer Lake	500	CT
Hell Roaring Lake	2,500	CT
Hell Roaring Lake	1,000	GR
Decker Lake #1	500	CT
McDonald Lake #2	500	CT
Hell Roaring Lake # 1	500	CT
Hell Roaring Lake # 2	500	CT
Hell Roaring Lake #15 (Profile)	500	CT
Hell Roaring Lake #14 (Lucille)	500	CT
Imogene Lake #2	500	CT
Imogene Lake #1	2,000	RB
Imogene Lake #3	500	CT
Imogene Lake #4	250	CT
Imogene Lake #5	250	CT
Imogene Lake #6	250	CT
Parks Peak	500	CT
Alpine Creek Lake #15	500	GR
Alpine Creek Lake #13	500	GR
Alpine Creek Lake #14	500	GR
Alpine Creek Lake # 8	250	CT
Alpine Creek Lake # 9	250	CT
Alpine Creek Lake #10	250	GR

Table 1. Continued.

Lake name		Number stocked	Species[a]
Alpine Creek Lake #12		250	CT
Alpine Creek Lake #11		500	CT
Alpine Creek Lake # 4		1,000	GR
Alpine Creek Lake # 5		500	CT
Alpine Creek Lake # 6		500	CT
Alpine Creek Lake # 7		500	CT
Alpine Creek Lake 1 3		500	CT
Alpine Creek Lake # 2		500	CT
Rainbow Lake		1,500	GR
MacRae Lake		1,500	GR
	Rainbow	3,500	
	Grayling	7,750	
	Cutthroat	19,250	
	Total	30,500	

[a]CT=cutthroat trout.
RB=rainbow trout.
GR=grayling.

Table 2. Challis National Forest mountain lake fry plants, 1988.

Lake name	Number stocked	Species[a]
Valley Creek #1	500	CT
Valley Creek #2	500	CT
Hindman #2	750	CT
Hindman #1	500	CT
Cabin CreekPeak Lake #3	500	CT
Cabin CreekPeak Lake #4	500	CT
Cabin CreekPeak Lake #5	500	CT
Tango Lake #6	750	CT
Tango Lake #5	750	CT
Tango Lake #4	750	CT
Tango Lake #3	500	CT
Loon CreekLake #4	500	CT
Knapp Lake # 8	500	CT
Knapp Lake # 7	500	CT
Knapp Lake # 3	500	CT
Knapp Lake #14	500	GR
Fish Lake (Loon #3)	500	CT
Horseshoe Lake	500	CT
Loon Creek Lake #11	500	CT
Loon Creek Lake #12	500	CT
Loon Creek Lake #14	500	CT
Loon Creek Lake #13	1,000	CT
Kidney Lake	500	RB
Cliff Creek Lake #4	500	CT
Cliff Creek Lake #1	500	CT
F-82	1,000	CT
Baldwin Lake	500	CT
Vanity Lake #13	1,000	GR
Vanity Lake # 8	250	CT
Vanity Lake # 5	250	CT
Vanity Lake # 3	750	CT
Vanity Lake # 1	750	CT
Vanity Lake # 4	500	CT
Seafoam Lake #3	1,000	GR
Seaform Lake #4	500	GR
Harlan Lake #2	500	CT
Harlan Lake #1	500	CT
Lost Lake	500	CT
Muskeg Lake #1	500	RB
Muskeg Lake #3	500	RB
Soldier Lake # 2	250	CT
Soldier Lake # 8	250	CT

Table 2. Continued.

Lake name	Number stocked	Species[a]
Soldier Lake # 7	250	CT
Soldier Lake #10	250	CT
Soldier Lake #11	250	CT
Iris Lake #3	500	RB
Iris Lake #8	500	CT
Finger Lake #2		
Fall Creek Lake #3	250	RB
Rocky Lake	1,000	CT
Langer Lake	1,000	CT
Island Lake	1,000	CT
Ruffneck Lake	1,000	CT
S. Fork Fall Cr. Lake #3 (Driftwood)	250	RB
Collie Lake	750	CT
Lola Creek Lake #2	500	CT
Lola Creek Lake #3	500	CT
Rainbow Lake	250	RB
Rainbow	2,750	
Grayling	3,000	
Cutthroat	26,000	
Total	31,750	

[a]CT=cutthroat trout.
RB=rainbow trout.
GR=grayling.

JOB PERFORMANCE REPORT

STATE OF: Idaho

NAME: REGIONAL FISHERY MANAGEMENT INVESTIGATIONS

PROJECT NO.: F-71-R-13

TITLE: Salmon Subregion Lake and Reservoir Investigations

JOB NO.: 6(SAL)-b

PERIOD COVERED: July 1, 1988 to June 30, 1989

ABSTRACT

Hatchery catchable rainbow trout releases were evaluated in seven small lakes/ponds, including: Wallace Lake, Meadow Lake, Mosquito Flats Reservoir, Yellowjacket Lake, Big and Little Bayhorse lakes, and Yankee Fork Dredge Ponds. Total effort ranged from 79 h/hectare on Mosquito Flats Reservoir to 1,137 h/hectare on Meadow Lake. Catch rates ranged from 0.44 fish/h on Wallace Lake to 2.87 fish/h on Yankee Fork Dredge Ponds. Return to the creel for catchable rainbow trout was overestimated, but probably exceeded 25Z for each lake/pond. Stocking numbers are recommended to provide more uniform catch rates of approximately 1 fish/h.

Partial creel surveys were conducted on Redfish and Alturas lakes to evaluate increased stocking frequency from monthly to bi-weekly and 6,000 additional fish released into Alturas Lake. Data compared to previous information documented improved catch rates on both lakes.

Authors:

James A. Davis
Regional Fishery Biologist

James R. Lukens
Regional Fishery Manager

INTRODUCTION

Several lakes in the Salmon Subregion were stocked with hatchery catchable rainbow trout Oncorhynchus mykiss. The demand for catchable trout fisheries has increased to the point where it has become necessary to make more efficient use of these fish. A catchable trout program has one major goal, and that is to provide a fishery. The best way to measure the success of this program is to determine catch rates and return to the angler creel. Often, a complete creel census is conducted on a major fishery to determine return to the creel, but this is not practical for less popular fisheries.

All of the lakes in the survey, except the Yankee Fork Dredge Ponds, were classified as mountain lakes exceeding 1,830 m elevation. Each lake had a developed campground adjacent to it. The Yankee Fork Dredge Ponds consist of four ponds that were filled with water following excavation during the mining boom from 1920-1940. There are several campgrounds on the Yankee Fork downstream from the ponds.

This report will discuss the results of a partial creel survey conducted in 1988 on seven small lakes and ponds. Recommendations for the future management of these lakes will be made. Also, this report will evaluate changes in the stocking of catchable rainbow trout into Redfish and Alturas lakes by determining the effect upon the fishery.

OBJECTIVES

1. Evaluate the fishery for catchable rainbow trout in seven small lakes and ponds.

2. Evaluate the change in stocking frequency and numbers of catchable rainbow trout released into Redfish and Alturas lakes.

RECOMMENDATIONS

1. Stock the following lakes/ponds accordingly:
   Wallace Lake - increase from 1,100 to 3,000 fish.
   Meadow Lake - increase from 3,700 to 4,000 fish.
   Mosquito Flats Reservoir - maintain at 2,000 fish.
   Yellowjacket Lake — increase from 2,000 to 2,500 fish. Big and Little Bayhorse lakes - maintain at 4,000 fish. Yankee Fork Dredge Ponds - reduce from 4,200 to 3,500 fish.

2. Maintain stocking numbers and bi-weekly frequency at Redfish and Alturas lakes.

METHODS

Small Lakes

The partial creel survey conducted on the lakes was patterned after a similar survey conducted by Horner et al. (1987). Conservation officers were asked to collect creel information on the lakes in their areas. The officers were asked to visit their lakes four times per month from June 1 to September 5, 1988. Two or three surveys were conducted on weekend days and one or two during weekdays. Each survey included an instantaneous angler count and angler interviews for hours fished, number of anglers per group, and number of fish caught by species (in most cases, exclusively catchable rainbow trout).

The data was summarized by weekends and weekdays for each lake. The average number of anglers per day type was calculated by summing the angler counts and dividing by the number of counts. Average angler hours per day type was calculated by multiplying the mean number of anglers per day type by 8 hours, which was the length of the day over which counts were made. This value was multiplied by the number of week days (68) and weekend days (30) to estimate total angler hours for the period. Total harvest was calculated by multiplying catch rates and total hours. Return to the creel was derived by dividing the total estimated catchable trout harvested by number stocked.

Redfish and Alturas Lakes

In 1987, Redfish and Alturas lakes were stocked monthly. In 1988, the stocking frequency was increased to twice monthly. The number of catchable rainbow stocked into Alturas Lake was increased from 15,000 to 20,220, and approximately the same number, 20,220, was stocked into Redfish lake.

Angler interviews were conducted on five weekend days during July, August, and September to determine catch rates for catchable rainbow trout. These catch rates were compared to previous rates reported by Reingold and Davis (1987, 1988) to evaluate stocking changes.

RESULTS

Small Lakes

Total estimated effort ranged from 4,547 hours on Meadow Lake, to 1,270 hours on Mosquito Flats Reservoir (Table 1). Catch rates were good in all of the lakes/ponds and ranged from slightly less than 0.5 fish/h to just under 3 fish/h. Return to the creel was probably overestimated and ranged from 33-100%.

Table 1. Creel survey results for seven small lakes and ponds, 1988.

Lake	Estimated effort (h)	Estimated harvest	Catch rate (fish/h)	Fish stocked	Percent return
Wallace Lake	2,805	1,241	0.44	1,120	100
Meadow Lake	4,547	3,399	0.75	3,705	92
Mosquito Flats Reservoir	1,270	654	0.51	1,982	33
Yellowjacket Lake	1,990	1,078	0.54	1,997	54
Big and Little Bayhorse lakes	2,406	3,961	1.65	4,995	79
Yankee Fork Dredge Ponds	2,040	5,856	2,87	4,242	100

Meadow Lake was the most heavily fished lake relative to its size with 1,137 h/hectare (Table 2). Mosquito Flats Reservoir was the most lightly fished with 79 h/hectare. The Yankee Fork Dredge Ponds produced the largest estimated yield (1,464 fish/hectare) with moderate fishing intensity (510 h/hectare). Stocking densities ranged from 124 fish/hectare in Mosquito Flats Reservoir to 1,060 in the Yankee Fork Dredge Ponds.

Redfish and Alturas Lakes

In six days between mid-June and late August, 105 anglers fishing Redfish Lake were interviewed that expended 285 hours to catch 288 fish for a catch rate of 1.0 fish/h (Table 3). During the same period, 98 anglers were interviewed while fishing on Alturas Lake. They fished 286 hours to catch 247 fish for a catch rate of 0.9 fish/h.

In 1986 and 1987, catchable rainbow trout contributed slightly more than half of the fishery on Redfish Lake and approximately three-fourths on Alturas Lake (Table 4). Other species in the harvest included bull trout, kokanee, wild rainbow trout, and brook trout in Redfish Lake, and wild rainbow trout, bull trout, kokanee, and cutthroat trout in Alturas Lake (Reingold and Davis 1987, 1988). In 1988, the census was limited to six days. Due to the reduced sampling frequency and consumption of many creeled fish, we did not obtain an accurate estimate of catchable rainbow trout in the creel.

DISCUSSION

Small Lakes

Estimates of total effort were imprecise due to few counts and large variation in angler numbers. Catch rate estimates may have been biased, resulting in overestimates for several lakes. This was particularly evident at the Yankee Fork Dredge Ponds, where some interviews were conducted soon after stocking when catch rates were high. As a result, return of hatchery catchable rainbow trout was overestimated, particularly for Wallace Lake and Yankee Fork Dredge Ponds, where more estimated fish were harvested than stocked. Despite the overestimates, return rates for the seven lakes/ponds appeared high based on small lake size (4-18 hectares), high catch rates, and good angler participation.

The average catch rate for the seven lakes/ponds in 1988 was just over 1.0 fish/h, with 17,041 catchable rainbow trout released (Table 5). Catch rates varied considerably and ranged from 0.44 in Wallace Lake to 2.87 in the Yankee Fork Dredge Ponds. It would seem a reasonable goal, therefore, to manage these lakes for a more uniform catch rate approaching 1 fish/h without large increases in fish stocked. The proposed stocking numbers were adjusted to reflect this goal (Table 5).

Table 2. Fish stocked, estimated harvest, and effort per hectare for seven small lakes and ponds, 1988.

Lake	Area (hectares)	Fish stocked/ hectare	Effort (h/hectare)	Fish harvested/ hectare
Wallace Lake	4.0	280	701	310
Meadow Lake	4.0	926	1,137	850
Mosquito Flats Reservoir	16.0	124	79	41
Yellowjacket Lake	4.8	416	415	225
Big and Little Bayhorse Lakes	18.0	278	134	220
Yankee Fork Dredge Ponds	4.0	1,060	510	1,464

Table 3. Creel data collected on Redfish and Alturas lakes during the same count days, 1986-88.

Lake	Year	Anglers interviewed	Hours fished	Fish kept	Fish released	Total catch rate (fish/h)	Hatchery rainbow trout		
							Number caught	(Z)	Catch rate (fish/h)
Redfish	1986	143	224	67	8	0.3	61	(91)	0.3
	1987	126	208	55	36	0.4	41	(75)•	0.2
	1988	105	285	183	105	1.0	--		-
Alturas	1986	191	166	100	18	0.7	102	(100)	0.6
	1987	72	67	49	3	0.8	48	(98)	0.7
	1988	98	286	198	49	0.9	--		-

Table 4. Total estimated effort, harvest and return to the creel for hatchery catchable rainbow trout in Redfish and Alturas lakes, 1987-88.

Lake	Year	Effort (h)	Catch	Catch rate (fish/h)	Hatchery rainbow trout				
					Harvest	(Z)	Catch rate (fish/h)	Stocked	Z Return
Redfish	1986	15,449	8,524	0.6	5,173	(82)	0.3	36,105	14
	1987	12,523	8,665	0.7	4,699	(69)	0.4	21,363	22
	1988	--	--	1.0	--		-	20,220	--
Alturas	1986	12,577	10,705	0.9	7,790	(95)	0.6	20,000	39
	1987	10,126	4,074	0.4	3,158	(91)	0.3	14,417	22
	1988	--	--	0.9	--		-	20,220	--

Table 5. Effort, catch rate, 1988 stocking levels, and proposed adjustments for seven small lakes/ponds.

Lake	Effort (h/hectare)	Catch rate (fish/h)	Fish stocking 1988	Fish stocking Proposed
Wallace Lake	701	0.44	1,120	3,000
Meadow Lake	1,137	0.75	3,705	4,000
Mosquito Flats Reservoir	79	0.51	1,982	2,000
Yellowjacket Lake	415	0.54	1,997	2,500
Big and Little Bayhorse Lakes	134	1.65	4,995	4,000
Yankee Fork Dredge Ponds	510	2.87	4,242	3,500

Alturas and Redfish Lakes

Even though no data was collected for hatchery rainbow trout catch rates and creel composition in 1988, overall catch rates increased in both lakes from 1987 to 1988. Assuming that numbers of other species caught remained fairly stable, then the improved catch rates could be attributed to increased availability of catchable rainbow trout due to changes in stocking frequency and numbers. Overall catch rates in Redfish Lake increased from a season estimate of 0.7 fish/h in 1987 to a partial season estimate of 1.0 fish/h. Presumably, this was the result of a change in stocking frequency from monthly to bi-weekly. In Alturas Lake, similar estimates increased from 0.4 to 0.9 fish/h with the same change in stocking frequency and 6,000 additional fish released.

LITERATURE CITED

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JOB PERFORMANCE REPORT

STATE OF: Idaho **NAME:** REGIONAL FISHERY MANAGEMENT INVESTIGATIONS

PROJECT NO.: F-17-R-13 **TITLE:** Salmon Subregion Rivers& Streams Investigations - Salmon River creel census

JOB NO: 6(SAL)-c[l]

PERIOD COVERED: July 1, 1988 to June 30, 1989

ABSTRACT

Anglers fishing the Salmon River between Hell Roaring Creek and Torreys, May-September 1988, experienced a catch rate of 2.1 fish/h. They fished an estimated 37,816 h to harvest 12,377 hatchery rainbow trout, 6,836 steelhead smolts, 3,372 unidentified trout, 520 wild rainbow trout, 424 fish of other species, 157 bull trout, 97 cutthroat trout, and 52 brook trout.

Estimated return to the creel for catchable rainbow trout was 25% from creel census data and 41% from reward tag returns.

Estimated return to the creel for catchable rainbow trout stocked into four additional sections of the Salmon River, between Torreys and the Pahsimeroi River, based on reward tag returns, ranged from 4% to 37%.

Authors:

James A. Davis
Regional Fishery Biologist

James R. Lukens
Regional Fishery Manager

INTRODUCTION

The Salmon River originates in the Sawtooth Valley and flows 643 km to the confluence with the Snake River. The section of river between Stanley and Challis, Idaho, provides fishing opportunity for steelhead during fall and spring and resident trout throughout the summer. The summer fishery is supported by bull trout Salvelinus confluentus, brook trout Salvelinus fontinalis, cutthroat trout Oncorhynchus clarkii, whitefish Prosopium williamsoni and rainbow trout Oncorhynchus mykiss.

The most recent study on the upper Salmon River, that included a creel survey, was conducted by Partridge (1985). This project examined the effect of steelhead smolt size at time of release on residualism. The creel survey ran from May through mid-August and collected little information on catchable trout stocked in this area.

This study evaluated the summer trout fishery on the Salmon River between Hell Roaring Creek and Torreys boat ramp from May 28 to September 5. Emphasis was placed on catchable trout and steelhead smolt contributions to the fishery.

OBJECTIVES

1. To determine return to the creel of catchable rainbow trout stocked into the Salmon River between Hell Roaring Creek and Torreys boat ramp.

2. To determine the contribution of steelhead smolts to the fishery in this area.

3. To determine total fishing pressure and distribution of anglers.

RECOMMENDATIONS

1. Reduce number of catchables stocked from 50,000 to 40,000.

2. Redistribute stocked fish to heavily fished areas.

3. Stock area above hatchery prior to opening day and again immediately after run-off.

METHODS

The surveyed section of the Salmon River is 58 km long and included the area from Hell Roaring Creek to Torreys boat ramp (Figure 1). This area was divided into two sections: 1) Hell Roaring Creek to Lower Stanley, and 2) from Lower Stanley to Torreys boat ramp. The sampling began May 28 and ended September 5. This period was divided into seven 14-day intervals and one 3-day interval. Each section was sampled two weekend days and two weekdays during each interval. Angler counts were made four times per day. Starting times varied from 0600 hours to 1000 hours, and each succeeding count was 3 hours later.

Anglers were interviewed between count times for hours fished, number and species of fish kept or released, and whether the trip was completed. Rainbow trout were recorded as hatchery, wild, steelhead smolt, or residualized steelhead smolt (smolts released in previous years, identified by missing adipose fins and >300 mm long).

Catch rates were calculated for each species and rainbow trout type by interval and section. Total hours fished in an interval was calculated by multiplying the mean number of anglers per day type, average day length, the number of day types in the interval, and summing the results for each day type. To estimate harvest, total hours for each interval was multiplied by species-specific catch rates.

As an additional method of estimating return rate for catchable rainbow trout, $5.00 reward tags were placed on 5% of the fish stocked into the Salmon River. Signs were posted along the river informing anglers about the tagged trout program. Anglers were required to mail in tags and data for date and location of the fish caught to receive the reward. The data will be used to refine distribution of stocked fish to increase return to the creel.

RESULTS

In the upper section of the Salmon River (Lower Stanley to Hell Roaring Creek), a total of 1,178 anglers were interviewed. They fished 1,509 hours and caught 2,660 fish (72% were released) for a total catch rate of 1.76 fish(h (Table 1). Hatchery rainbow trout and steelhead smolts comprised 44% and 35%, respectively, of the fish observed in angler creels. The remainder of the harvest included bull trout, wild rainbow trout, brook trout, unidentified trout, cutthroat trout, and other species (mainly whitefish).

The total estimated angler effort for the upper section was 14,341 hours (Table 2). The total estimated catch (including released fish) was 24,578 $\pm$ 22,200. The total estimated harvest was 6,713 fish, and included hatchery rainbow trout (44%), steelhead smolts (40%), unidentified trout (9%), other species (3%), wild rainbow trout (3%),

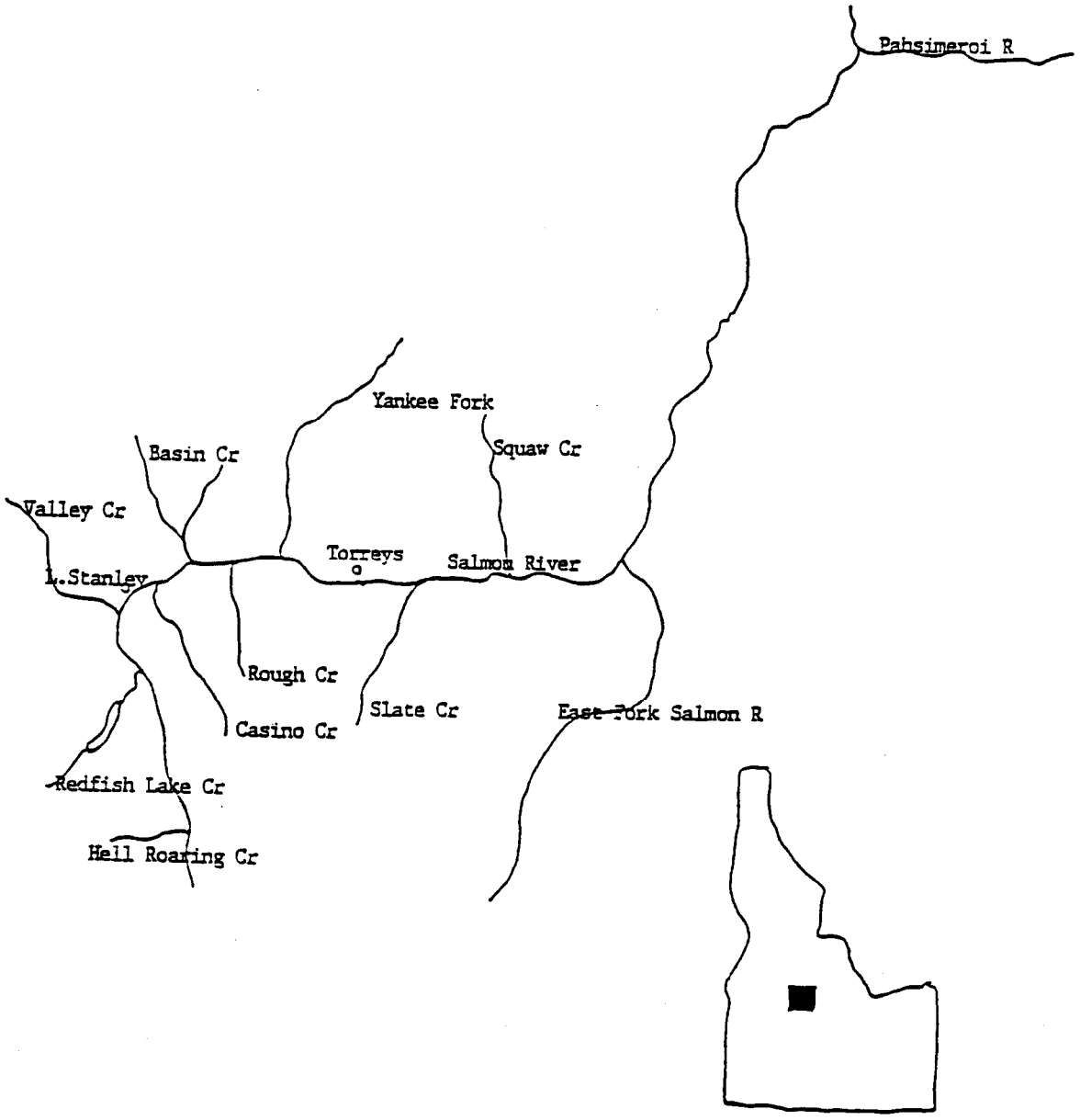

Figure 1. Map of Salmon River Study Area.

Table 1. Angler interview data for the upper Salmon River section (Hell Roaring Creek to Lower Stanley), May-September, 1988.

Interval	Number of anglers	Hours fished	Fish kept	Fish released	Catch rate (fish/h)	Species composition of creel: Wild rainbow	Hatchery rainbow	Tagged hatchery rainbow	Steelhead Smolts	Residualized steelhead smolts	Bull	Brook	Cutthroat	Unidentified Trout	Other Species
5/28-6/10	154	149	117	260	2.5	0	-	-	98	9	0	0	0	10	0
6/11-6/24	80	76	45	134	2.4	1	-	-	32	4	0	0		7	0
6/25-7/8	296	370	157	503	1.8	20	48	4	60	12	2	1	0	2	8
7/9-7/22	170	259	157	353	2.0	1	82	4	39	8	0	0	1	21	1
7/23-8/5	219	331	174	387	1.7	2	117	4	18	11	0	1	0	12	9
8/6-8/19	122	150	34	143	1.2	0	28	2	2	0	0	0	0	1	1
8/20-9/2	81	110	41	83	1.1	0	28	0	5	0	0	0	0	1	7
9/3-9/5	56	65	29	43	1.1	0	14	0	6	0	0	0	0	9	0
Total	1,178	1,510	754	1,906	1.8	24	317	14	260	44	2	2	2	63	26

Table 2. Estimated total angler effort and harvest, by species and rainbow trout type, for the upper Salmon River section (Hell Roaring to Lower Stanley), May-September,1988.

Interval	Wild Hours	rainbow	Hatchery rainbow	Tagged hatchery rainbow	Steelhead smolts	Residualized steelhead smolts	Unidentified Bull	Brook	Cutthroat	trout	Other Species
5/28-6/10	881	0	-	-	579	53	0	0	0	59	0
6/11-6/24	1,460	19	-	-	615	77	0	0	19	134	0
6/25-7/8	2,924	158	379	32	474	95	16	8	0	16	63
7/9-7/22	2,748	11	870	42	414	85	0	0	11	223	11
7/23-8/5	1,848	11	653	22	100	61	0	6	0	67	50
8/6-8/19	2,868	0	535	38	38	0	0	0	0	19	19
8/20-9/2	1,192	0	303	0	54	0	0	0	0	11	76
9/3-9/5	420	0	90	0	39	0	0	0	0	58	0
Total	14,341	199	2,830	134	2,313	371	16	14	30	587	219

cutthroat trout (<1%), bull trout (<1%), and brook trout (<1%). The return of hatchery rainbow trout released into the upper section, based on estimated harvest, was 22%. This probably represents a minimum estimate since many of the unidentified trout were probably hatchery rainbow.

In the lower section of the Salmon River (Lower Stanley to Torreys boat ramp), 1,120 anglers were interviewed (Table 3). They fished for 1,549 hours and caught 3,713 fish (70% were released), for a catch rate of 2.4 fish/h. Creeled fish were mostly hatchery rainbow trout and steelhead smolts, with bull trout, wild rainbow trout, cutthroat trout, unidentified trout, and other species (mainly whitefish) comprising the balance.

Total estimated angling effort was 23,475 hours (Table 4). Total estimated catch was 56,973 $\pm$ 46,093 fish. The estimated harvest was 17,122 fish and included 9,413 hatchery rainbow trout (55%), 4,152 steelhead smolts (24%), 2,785 unidentified trout (16%), 321 wild rainbow trout (2%), 205 fish of other species (1%), 141 bull trout (<1%), 67 cutthroat trout (<1%), and 38 brook trout (<1%).

The return to the creel for catchable rainbow trout in the lower section was 27%. For both river sections, 48,803 catchable rainbow trout were stocked, and the estimated harvest was 12,377 for a return of 25%.

A tagging study was conducted in the Salmon River in addition to the creel survey. A total of 2,737 tagged catchable rainbow trout were released into the river between Hell Roaring Creek and the Pahsimeroi River (Table 5). Anglers have returned 1,013 tags (37Z). Return rates in the upper and lower sections were 342 and 432 based on angler tag recoveries, compared to 222 and 27Z based on creel census harvest estimates. Return rates ranged from 4-162 in the three sections below Torreys boat ramp.

DISCUSSION

The summer trout fishery in the Salmon River was mainly supported by steelhead smolts and catchable rainbow trout. In 1988, approximately 1.3 million steelhead smolts were released into the Salmon River at the Sawtooth Hatchery, which is located approximately 14 km downstream from Hell Roaring Creek (the upper boundary of the study area). Smolts provided 29% of the total estimated harvest from both census sections (Figure 2). During the first two intervals of the census, and prior to catchable rainbow trout releases (May and June), smolts provided 892 of the estimated harvest, which was similar to the 882 value reported by Partridge (1985) for a similar period. As the summer progressed and steelhead smolts emigrated, the proportion of smolts in the harvest declined (Figure 3).

Table 3. Angler interview data for the lower Salmon River section (Lower Stanley to Torreys boat ramp), May-September, 1988.

						Species composition of									
Interval	Number of anglers	Hours fished	Fish kept	Fish released	Catch rate (fish/h)	Wild rainbow	Hatchery rainbow	Tagged hatchery rainbow	Steelhead Smolts	Residualized steelhead	smolts	Bull	Brook	Cutthroat	Unidentified Trout	Other Species
5/28-6/10	145	196	170	427	3.0	1	-	-	153	3	2	0	0		11	0
6/11-6/24	53	78	62	124	2.4	1	-	-	54	1	2	2	0		0	2
6/25-7/8	204	204	80	209	1.4	2	3	0	46	5	3	0	2		16	3
7/9-7/22	179	254	157	334	1.9	6	113	6	9	3	0	0	1		18	1
7/23-8/5	263	364	309	674	2.7	3	225	17	13	2	1	0	1		41	6
8/6-8/19	115	173	141	244	2.2	4	78	5	3	0	0	0	0		51	0
8/20-9/2	89	170	91	275	2.2	0	69	2	1	0	0	0	0		17	2
9/3-9/5	72	110	112	304	3.8	1	86	6	3	0	1	0	0		15	0
Total	1,120	1,549	1,122	2,591	2.4	18	574	36	282	14	9	2	4		169	14

Table 4. Estimated total angler effort and harvest, by species and rainbow trout type, for the lower Salmon River section (lower Stanley to Torreys boat ramp), May-September, 1988.

Interval	Hours	Wild rainbow	Hatchery rainbow	Tagged hatchery rainbow	Steelhead smolts	Residualized steelhead	Bull	Brook	Unidentified Cutthroat	Other trout	Species
5/28-6/10	2,146	11	-	-	1,675	33	22	0	0	20	0
6/11-6/24	1,466	19	-	-	1,015	19	38	38	0	0	38
6/25-7/8	3,429	34	50	0	773	84	50	0	34	269	50
7/9-7/22	4,546	107	2,022	107	161	54	0	0	18	322	18
7/23-8/5	5,292	44	3,271	247	189	29	15	0	15	596	87
8/6-8/19	3,878	90	1,748	112	67	0	0	0	0	1,143	0
8/20-9/2	996	0	404	12	6	0	0	0	0	100	12
9/3-9/5	1,722	16	1,346	94	47	0	16	0	0	235	0
Total	23,475	321	8,841	572	3,933	219	141	38	67	2,785	205

Table 5. Tagged catchable rainbow trout released and recoveries from the Salmon River between Hell Roaring Creek and Pahsimeroi River, 1988.

Section	Total stocked	Tagged	Tags returned (N)	Tags returned (%)
Hell Roaring Creek-Lower Stanley	13,484	678	230	34
Lower Stanley-Torreys	34,659	1,714	742	43
Torreys-Yankee Fork Ranger Station	3,890	195	31	16
Yankee Fork Ranger Station-E. Fork	999	50	6	12
E. Fork-Pahsimeroi River	1,998	100	4	4
Total	55,030	2,737	1,013	37

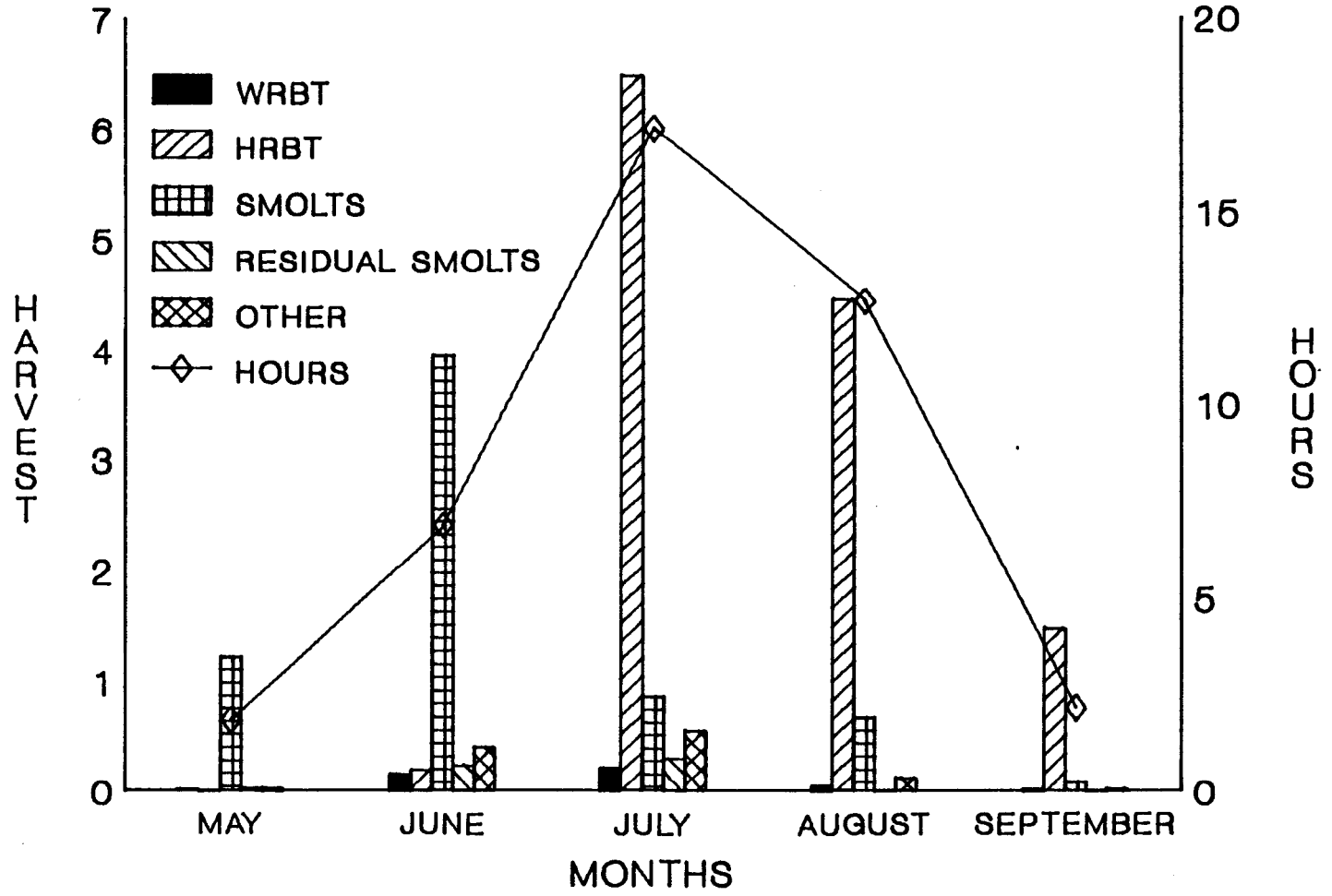

Figure 2. Estimated number of fish (thousands) harvested by species for each month, and estimated total hours (thousands) for the Salmon River Study Area, 1988.

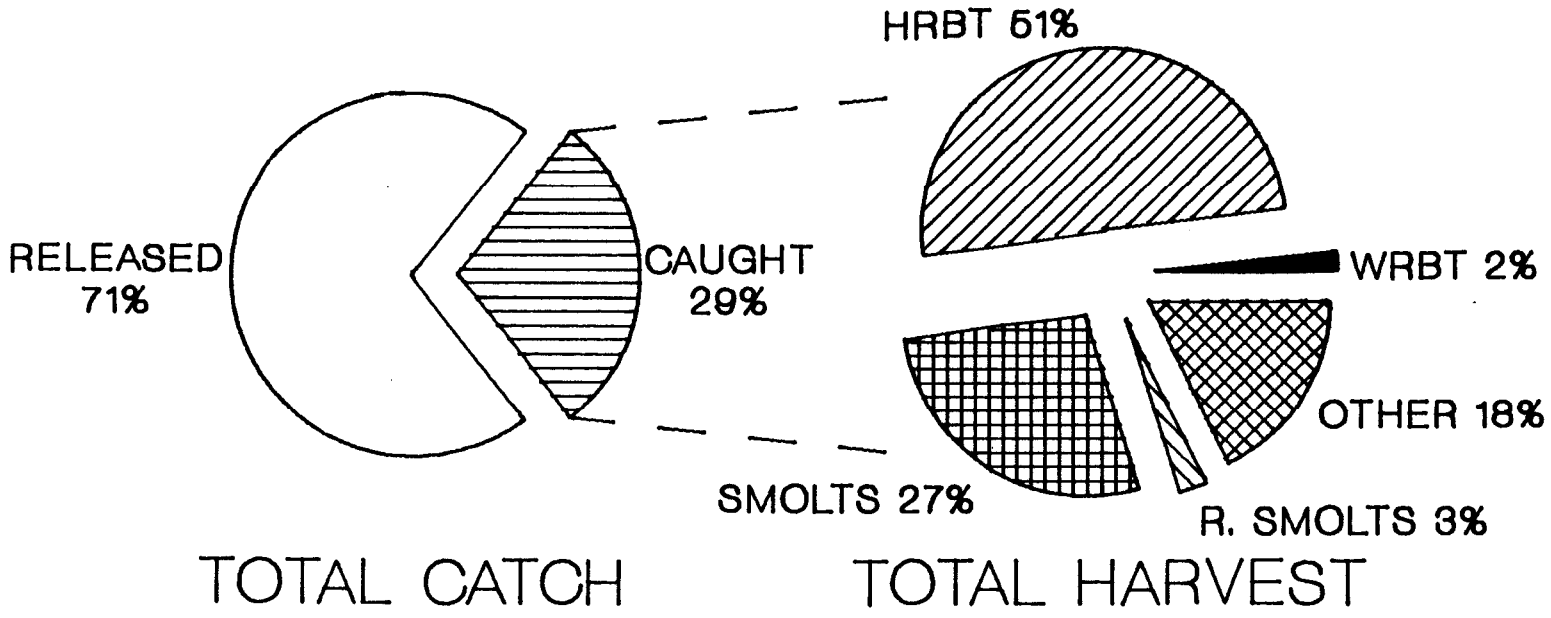

Figure 3. Percentage of fish caught and released in the total catch, and percentage of each species in the total harvest in the Salmon River Study Area, 1988. (Other includes bull trout, brook trout, cutthroat trout, whitefish and unidentified trout.)

Some steelhead smolts released into streams do not migrate to the ocean due to precocialism and residualism. The proportion of fish exhibiting this behavior varies and may range from 5-20% (Chrisp and Bjornn 1978). Some of these fish will survive, grow, and produce a fishery. The proportion of larger, residual smolts in the harvest averaged 22. The number of steelhead smolts released at Sawtooth Hatchery in 1988 was double that released in 1987 and should increase the number of residual smolts available to the fishery.

A large proportion of fish caught in the upper and lower creel survey areas were released, 722 and 702, respectively. Several factors could have accounted for this, including: angler attitudes toward catch-and-release fishing, small size of steelhead smolts (190 mm average length), undesirability of catchable rainbow trout, or overestimation of the actual numbers released.

One objective of the study was to determine the return rate of catchable rainbow trout released into the upper Salmon River. From Hell Roaring Creek to Torreys the estimated return, based on creel census data, was 25%. The same value, estimated from the return of $5.00 reward tags, was 41%. The lower value could be considered a minimum estimate since many creeled fish were not examined by Department personnel, and a large proportion of these fish were probably hatchery rainbow trout. The larger value is probably an overestimate, since anglers found that they could sort their catch and select for those fish with reward tags. Therefore, the actual return rate is probably between 25% and 41%. This rate is similar to that recorded in other Idaho waters, including: 252 for the Big Lost River (Elle et al. 1987), 32% for the Middle Fork Boise River (B. Rohrer, Idaho Department of Fish and Game, personal communication), 48% for the Big Wood River (Thurow 1988), 81% for the Boise River (Reid and Mabbott 1987), and 20% to 34% for the Lochsa River (Lindland and Pettit 1981; Lindland 1982).

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JOB PERFORMANCE REPORT

STATE OF: Idaho **NAME:** REGIONAL FISHERY MANAGEMENT INVESTIGATIONS

PROJECT NO.: F-71-R-13 **TITLE:** Salmon Subregion Rivers and Streams Investigations –

JOB NO: 6(SAL)-c[2] Salmon & Middle Fork Salmon Rivers Snorkeling Transects

PERIOD COVERED: July 1, 1988 to June 30, 1989

ABSTRACT

The total number of cutthroat trout, juvenile rainbow/steelhead trout, and chinook salmon counted in MFSR transects was 207, 141, and 64 fish, respectively. Mean densities were 0.7, 0.6, and 0.3 fish/100 m^2, respectively. Juvenile steelhead densities have remained fairly stable, with a slight increase from 1987 to 1988.

The number of cutthroat trout declined 45% from 1987 to 1988, and have shown a general decline since 1984. Densities since 1985 have followed fluctuations in total numbers. A change in population size structure was also noted. The proportion of fish longer than 300 mm declined to 15%, which was similar to 1971 prior to the establishment of catch-and-release regulations.

Due to differences in the timing of data collection, July or August, trends for juvenile chinook salmon densities have not been identified. A consistant sampling date must be established to collect comparable data.

Densities of juvenile steelhead in MFSR tributary transects increased from 1987 to 1988, but have remained relatively stable since 1985. The same trend was noted for cutthroat trout. Chinook salmon densities have generally been low, but increasing since 1985.

Authors:

James A. Davis
Regional Fishery Biologist

James R. Lukens
Regional Fishery Manager

INTRODUCTION

The Middle Fork Salmon River (MFSR), part of the Wild and Scenic Rivers System, flows through a remote.area in central Idaho. Most of it is within the Frank Church River of No Return Wilderness Area. The Middle Fork originates at the confluence of Bear Valley and Marsh creeks near Cape Horn Mountain. The river flows 171 km to its confluence with the main Salmon River 92 km below Salmon, Idaho (Figure 1).

Road access exists to Dagger Falls and the Salmon River confluence. Headwaters of some tributaries are accessible via primitive roads. The lower 156 km of the Middle Fork is accessible only by aircraft, float boats, or horse/foot trails. The MFSR is a major recreational river that offers a wide variety of outdoor and backcountry opportunities. The number of people floating the river has increased 179% since 1973 (8,500 in 1986).

In 1971, studies were initiated to monitor the MFSR westslope cutthroat trout Oncorhynchus clarki lewisi population, and catch-and-release regulations were established in 1972. Similar regulations were adopted for major tributaries in the early and mid-1980s.

In 1971, snorkel transects were established and surveyed periodically to monitor the cutthroat trout population (Corley 1972; Jeppson and Ball 1977, 1979). In 1981, a project was initiated on the Middle Fork to evaluate wild steelhead trout Oncorhynchus mykiss (Thurow 1982, 1983, 1985). In 1985, another study was initiated to determine juvenile steelhead and chinook salmon O. tshawytscha densities in the Middle Fork and its tributaries (Reingold and Davis 1987[A]).

This report presents data collected in July and August 1988 pertaining to cutthroat trout and juvenile steelhead and chinook salmon densities in the Middle Fork Salmon River and five Salmon River tributaries downstream from the Middle Fork.

OBJECTIVES

1. To monitor juvenile steelhead trout and chinook salmon densities within the Middle Fork, its tributaries, and Salmon River tributaries.

2. To monitor the effects of catch-and-release regulations on cutthroat, rainbow Oncorhynchus mykiss, and bull trout Salvelinus confluentus populations.

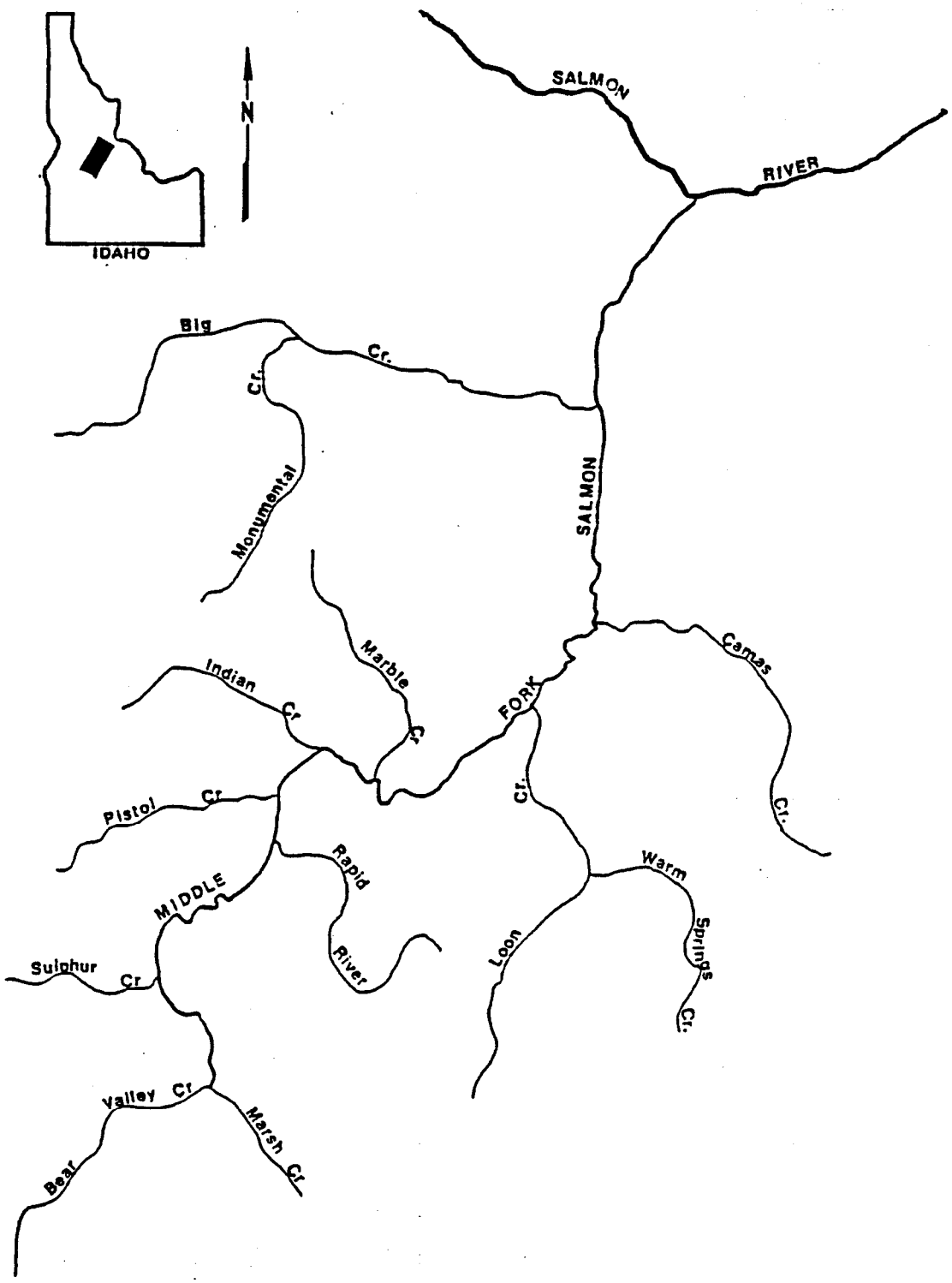

Figure 1. Middle Fork Salmon River drainage.

RECOMMENDATIONS

1. Monitor densities of juvenile steelhead, cutthroat trout, and chinook salmon in the MFSR via snorkeling between the second week of July and the third week of August.

2. When possible, conduct two counts, one in July and one in August. Compare steelhead numbers between counts.

METHODS

In 1988, all 29 Middle Fork Salmon River transects (Table 1), 7 tributary transects (Table 2), and 10 Salmon River tributary transects (Table 3) were surveyed via snorkeling. The upper seven MFSR transects and the Pistol Creek transects were surveyed August 17-18, and the remaining MFSR transects and tributary transects were surveyed July 17-21. The main Salmon River tributary transects were surveyed on August 9, 10, 21, and 22.

The techniques used to survey these transects are described by Reingold and Davis (1987A, 1987B).

The data was compared to historic data to identify trends.

RESULTS

Middle Fork Salmon River Transects

The total number of cutthroat trout, juvenile rainbow/steelhead trout, and juvenile chinook salmon counted in MFSR transects was 207, 147, and 64, respectively (Table 4). The mean densities were 0.7, 0.6, and 0.3 fish/100 m^2 for cutthroat trout, juvenile rainbow/steelhead trout, and juvenile chinook salmon, respectively (Table 5). One adult chinook salmon was observed in the Goat Creek Run transect.

The mean length of fish sampled by hook and line was 177 mm for rainbow/steelhead (N=19) and 249 mm for cutthroat trout (N-21).

Table 1. Length, visible corridor, and area of MFSR snorkeling transects, 1988.

Fish type[a]	Location (river km)[b]	Transect name	Length (m)	Visibility (m)	Visible corridor (m)	Arga (m)	Passe
SH	0.3	Boundary	55	3.45	6.9	380	1
Ct/Ck	4.3	Gardell's Hole	77	3.4	13.7	1,028	2
Ct/Ck	8.8	Velvet	46	3.1	6.1	2,806	1
SH	13.6	Elkhorn	130	3.2	6.4	832	1
SH	21.3	Sheepeater	165	2:45	4.9	809	1
Ct/Ck	24.5	Greyhound	30	3.65	7.3	219	1
SH	29.6	Rapid River	255	2.75	5.5	1,403	1
SH	40.0	Indian	160	3.35	13.4	2,144	2
Ct/Ck	44.3	Pungo	70	3.35	13.4	938	2
Ct/CK	51.0	Marble Pool	181	4.8	18.7	3,385	2
SH	52.3	Ski-jump	88	3.35	13.4	1,179	2
Ct/Ck	60.6	Lower Jackass	252	4.15	8.3	2,092	1
SH	64.6	Cougar	106	4.4	8.8	933	1
Ct/Ck	73.9	Whitey Cox	106	4.4	8.8	933	1
SH	74.1	Rock Island	110	3.55	7.1	781	1
Ct/Ck	82.9	Hospital Pool	135	3.3	6.6	891	1
SH	84.3	Hospital Run	165	3.45	6.9	1,139	1
Ct/Ck	92.6	Tappan Pool	110	3.9	15.6	1,716	2
SH	92.8	Lower Tappan Run	145	3.9	7.8	1,131	1
Ct/Ck	106.6	Flying B	130	3.9	7.8	1,041	1
SH	108.6	Airstrip	91	3.9	7.8	710	1
SH	119.7	Survey	130	3.9	7.8	1,014	1
Ct/Ck	124.6	Big Creek Bridge	103	2.45	4.9	505	1
SH	127.8	Love Bar	85	4.9	9.8	833	1
Ct/Ck	135.8	Ship Island	130	3.35	6.7	871	1
SH	144.0	Little Ouzel	110	3.35	6.7	737	1
Ct/Ck	144.6	Otter Bar	206	3.35	13.4	2,760	1
Ct/Ck	151.5	Goat Creek Pool	102	3.65	14.6	1,489	2
SH	151.8	Goat Creek Run	102	3.65	7.3	745	1

[a]SH-steelhead, Ct-cutthroat, Ck-chinook salmon.
[b]River km starts at Dagger Falls.

Table 2. MFSR tributary transects.

Transect name	Location
Pistol Creek #1	At mile marker 16
Pistol Creek 12	Above mile marker 16
Marble Creek #1 (mouth)	Above pack bridge
Loon Creek #1 (bridge)	Below pack bridge
Loon Creek #2 (run)	400 yards above pack bridge
Camas Creek #1 (mouth)	From pack bridge downstream
Big Creek #1 (mouth)	400 yards above mouth

Table 3. Main Salmon River tributary transects.

Transect name	Location
Horse Creek #1 (bridge)	50 yards above bridge
Horse Creek #2	150 yards above bridge
Chamberlain Creek #1 (mouth)	400 yards above mouth
Chamberlain Creek #2 (run)	500 yards above mouth
Bargamin Creek #1	1/4 mile above mouth
Bargamin Creek #2	At trail flat above 11
Sheep Creek #1	Below pack bridge
Sheep Creek #2	300 yards above pack bridge
Pahsimeroi River #1 (lower)	100 yards below Dowton Lane Bridge
Pahsimeroi River #2 (Dowton Ln.)	Run above + pool below Dowton Bridge

Table 4. Total number of cutthroat trout, rainbow/steelhead, and chinook salmon, by length group (mm) and other fish species counted in MFSR transects, July/August 1988.

	Cutthroat			Rainbow/steelhead				Chinook salmon				
Transect	75-150	150-230	230-300	>300	75-150	150-230	230-300	>300	Age 0	Age I	Bull trout	Whitefish	Other[a]
Boundary	0	0	2	2	0	0	0	0	0	0	0	13	0
Garden's Hole	0	0	1	1	0	0	0	0	0	0	0	4	0
Velvet	0	0	2	0	3	0	0	0	0	0	0	1	0
Elkhorn	0	0	0	0	0	4	0	0	3	0	0	4	0
Sheepeater	0	1	0	1	9	3	0	0	8	0	0	4	0
Greyhound	0	1	7	3	6	5	0	0	8	0	0	1	0
Rapid River	0	3	8	4	5	6	0	0	0	0	1	18	0
Indian	0	12	3	0	6	10	0	0	5	0	0	9	0
Pungo	1	8	3	1	0	0	0	0	5	0	0	8	1
Marble Pool	0	23	5	0	2	0	0	0	9	0	0	11	0
Ski-jump	0	3	3	3	1	0	0	0	6	0	0	14	0
Lower Jackass	0	2	2	1	1	0	0	0	0	0	0	1	0
Cougar	0	3	3	3	0	0	0	0	0	0	0	3	0
Whitey Cox	0	7	3	0	2	1	0	0	5	0	0	7	0
Rock Island	0	0	0	0	0	0	0	0	6	0	0	5	3
Hospital Pool	0	7	5	6	4	0	0	0	0	0	0	5	2
Hospital Run	0	0	0	0	6	4	0	0	0	0	0	15	0
Tappan Pool	2	4	3	1	6	4	0	0	0	0	0	6	3
L. Tappan Run	0	0	0	0	2	0	0	0	0	0	0	3	3
Flying B	0	3	8	1	0	1	0	0	0	0	0	3	5
Airstrip	0	2	1	0	7	3	1	0	0	0	0	6	33
Survey	0	0	0	0	0	0	0	0	0	0	0	0	0
Big Creek Bridge	0	0	0	0	1	1	0	0	6	0	0	0	0
Love Bar	0	0	1	0	0	1	0	0	0	0	0	1	0
Ship Island	0	3	2	0	2	0	0	0	0	0	0	5	0
Little Ouzel	0	0	0	0	3	0	0	0	0	0	0	5	10
Otter Bar	0	11	9	2	14	7	0	0	3	0	0	9	34
Goat Cr. Pool	0	3	4	1	5	1	2	0	0	0	0	13	6
Goat Cr. Run	0	1	1	1	2	0	0	0	0	0	0	9	1
Column total	3	97	76	31	87	51	3	0	64	0	1	183	101
Grand total			207				141			64	1	183	101

[a]Suckers, squawfish, shiners.

Table 5. Densities of cutthroat trout, rainbow/steelhead, and chinook salmon (fish/100 m^2) in MFSR transects, July/August 1988.

Transect	Cutthroat	Rainbow/ steelhead	Chinook	Total fish[a]
Boundary	1.1	0	0	4.5
Gardell's Hole	0.2	0	0	0.6
Velvet	0.7	1.1	0	2.1
Elkhorn	0	0.5	0.4	1.3
Sheepeater	0.2	1.5	1.0	3.2
Greyhound	5.0	5.0	3.7	14.2
Rapid River	1.1	0.8	0	3.2
Indian	0.7	0.7	0.2	2.1
Pungo	0.7	0	0.3	1.4
Marble Pool	0.8	0.1	0.3	1.5
Ski-jump	0.4	<0.1	0.3	1.3
Lower Jackass	0.2	0.1	0	0.3
Cougar	1.0	0	0	1.3
Whitey Cox	1.1	0.3	0.5	2.7
Rock Island	0	0	0.8	1.8
Hospital Pool	2.0	0.5	0	3.3
Hospital Run	0	0.9	0	2.2
Tappan Pool	0.6	0.6	0	2.1
L. Tappan Run	0	0.2	0	0.7
Flying B	1.2	0.1	0	2.1
Airstrip	0.4	1.5	0	7.5
Survey	0	0	0	0
Big Cr. Bridge	0	0.4	1.2	1.6
Love Bar	0.1	0.1	0	0.4
Ship Island	0.2	0.6	0	1.4
Little Ouzel	0	0.4	0	2.4
Otter Bar	0.8	0.9	0.1	3.4
Goat Cr. Pool	0.5	0.5	0	2.4
Goat Cr. Run	0.2	0.1	0	0.9
Average	0.7	0.6	0.3	2.5

[a]Total fish also includes suckers, shiners, squawfish, whitefish, and bull trout.

Middle Fork Salmon River Tributary Transects

Juvenile rainbow/steelhead densities ranged from 1 to 16 fish/100 m^2 and averaged 7 fish/100 m^2 (Table 6)•. Mean juvenile chinook density was 2 fish/100 m^2, and mean cutthroat trout density was 1 fish/100 m^2.

Salmon River Tributary Transects

The transects in Horse, Chamberlain, and Bargamin creeks were surveyed August 8-9, and the Sheep Creek and Pahsimeroi River transects were surveyed August 21-22. The rainbow/steelhead observed in Horse, Chamberlain, Bargamin, and Sheep creeks were predominately juvenile steelhead. The Pahsimeroi River supports healthy densities of juvenile steelhead and resident rainbow, as evidenced by the presence of larger fish (Table 7). Rainbow/steelhead densities ranged from 0 to 19 fish/100 m^2 and averaged 11 (excluding Pahsimeroi River transects). We observed 10 and 14 rainbow/steelhead/100 m^2 in the two Pahsimeroi River transects.

Juvenile chinook densities ranged from 0 to 14 fish/100 m^2, with the largest densities observed in Pahsimeroi River transects.

With the exception of Sheep Creek, cutthroat trout were not observed in large numbers. The counts ranged from 0 to 31 fish/100 m^2. No cutthroat trout were observed in the Pahsimeroi River.

DISCUSSION

Middle Fork Salmon River Transects

Comparison of juvenile steelhead densities using only traditional steelhead transects, which were established in 1981 (Thurow 1983), indicated a fluctuating but generally upward trend (Figure 2). Since 1985, additional transects have been added to enumerate cutthroat trout and chinook salmon. Juvenile steelhead densities have remained fairly stable using estimates from all transects, but increased from 1987 to 1988 (Figure 3). The yearly fluctuations in juvenile abundance can be attributed to numerous factors, but the most important has probably been downstream survival affecting, adult escapement and smolt outmigration.

The age structure of juvenile steelhead since 1985 is shown in Table 8. Prior to 1988, age group II had been the dominate age class observed, but in 1988 age group I dominated the sample (82%). The large increase, 93Z, in age group I over the three-year average of 28% could be attributed to a couple of factors.

Table 6. Number of rainbow/steelhead and cutthroat trout by length group (mm), juvenile chinook salmon, and miscellaneous species (Wf-whitefish, Bt-bull trout) counted in MFSR tributary transects,.July 1988.

		Rainbow/steelhead						Cutthroat						Chinook				
														Age				
Location	Area 2 (m)	<75	75-150	150-230	230-300	>300	Rb/100 m^2	<75	75-150	150-230	230-300	>300	Ct/100 m	0	I	Ck/100 m^2	Wf	Bt
Pistol Cr. 1 (lower)[a]	162	4	6	7	1	0	11.1	0	0	0	0	1	0.6	2	5	4.3	1	0
Pistol Cr. #2 (upper)[a]	474	0	2	3	1	0	1.3	0	0	0	0	2	0.4	3	5	1.7	6	0
Marble Creek #1 (lower)	968	2	7	2	0	0	1.1	0	1	2	0	0	0.3	0	0	0	2	0
Loon Cr. #1 (lower)	182	4	14	11	1	0	16.5	0	0	3	2	1	3.3	2	6	4.4	11	0
Loon Creek #2 (upper)	366	3	12	7	0	0	6.0	0	0	0	0	0	0	0	0	0	17	0
Camas Cr. #1 (lower)	325	3	13	5	0	0	6.5	0	0	6	5	0	3.4	7	0	2.2	5	0
Big Creek #1 (lower)	305	0	13	7	0	0	6.6	0	0	2	1	1	1.3	3	0	1.0	16	1
Mean							6.9						1.3			1.9		
Weighted mean							4.3						1.0			1.2		

[a]surveyed August 9, 1988.

Table 7. Number of rainbow/steelhead and cutthroat trout, by length group (mm), juvenile chinook salmon, and miscellaneous species (Bt=bull trout, 8k-brook trout, 0-whitefish) counted in Salmon River tributary transects, August 1988.

		Rainbow/steelhead						Cutthroat						Chinook					
Location	Area (mi²)	<75	75-150	150-230	230-300	>300	Rb/100 m²	<75	75-150	150-230	230-300	>300	Ct/100 m²	Age 0	Age I	Ck/100 m²	Bt	Bk	Wf
Horse Cr. #1 (Bridge)	396	6	35	12	3	0	14.1	0	0	0	0	0	0.0	0	0	0.0	1	0	11
Horse Creek #2	545	15	37	31	3	0	15.8	0	0	0	4	0	0.7	0	0	0.0	1	0	0
Chamberlain Cr. #1 (mouth)	254	6	30	13	0	0	19.3	0	0	0	0	2	0.8	4	0	1.6	0	0	9
Chamberlain Cr. #2 (run)	360	19	16	9	0	0	12.2	0	1	0	0	0	0.3	6	0	1.7	0	0	21
Bargamin Cr. #1	284	2	14	11	0	0	9.5	0	0	0	0	0	0.0	0	0	0.0	0	0	2
Bargamin Cr. #2	403	3	17	13	1	0	8.4	0	0	0	0	0	0.0	6	0	1.5	1	0	3
Sheep Cr. #1	361	0	0	0	0	0	0.0	4	3	3	1	0	3.0	0	0	0.0	2	0	18
Sheep Cr. #2	75	6	0	0	0	0	8.0	8	8	4	0	3	30.7	0	0	0.0	1	0	15
Pahsimeroi River #2 (Dowton Lane)	731	0	19	49	23	13	14.2	0	0	0	0	0	0.0	72	14	11.8	0.2	0	120
Pahsimeroi River #1	251	0	8	10	3	4	10.0	0	0	0	0	0	0.0	35	0	13.9	0	0	22
Mean							11.1						3.5			3.1			
Mean, excluding Pahsimeroi							10.9						4.4			0.6			
Weighted mean							11.7						1.1			3.8			
Weighted mean, excluding Pahsimeroi							11.1						1.5			0.6			

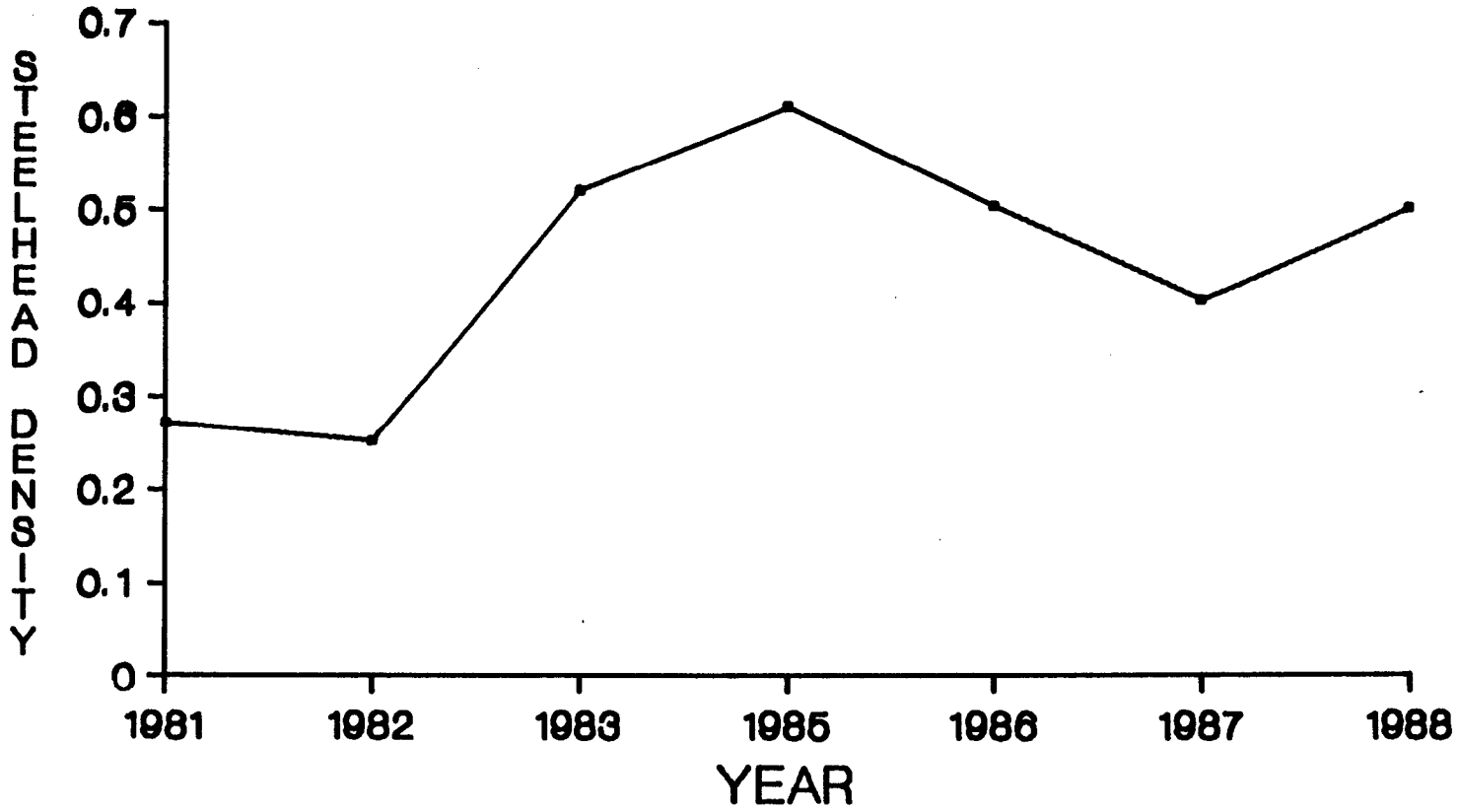

Figure 2. Mean juvenile steelhead densities (fish/100 m^2) in MFSR, steelhead transects only.

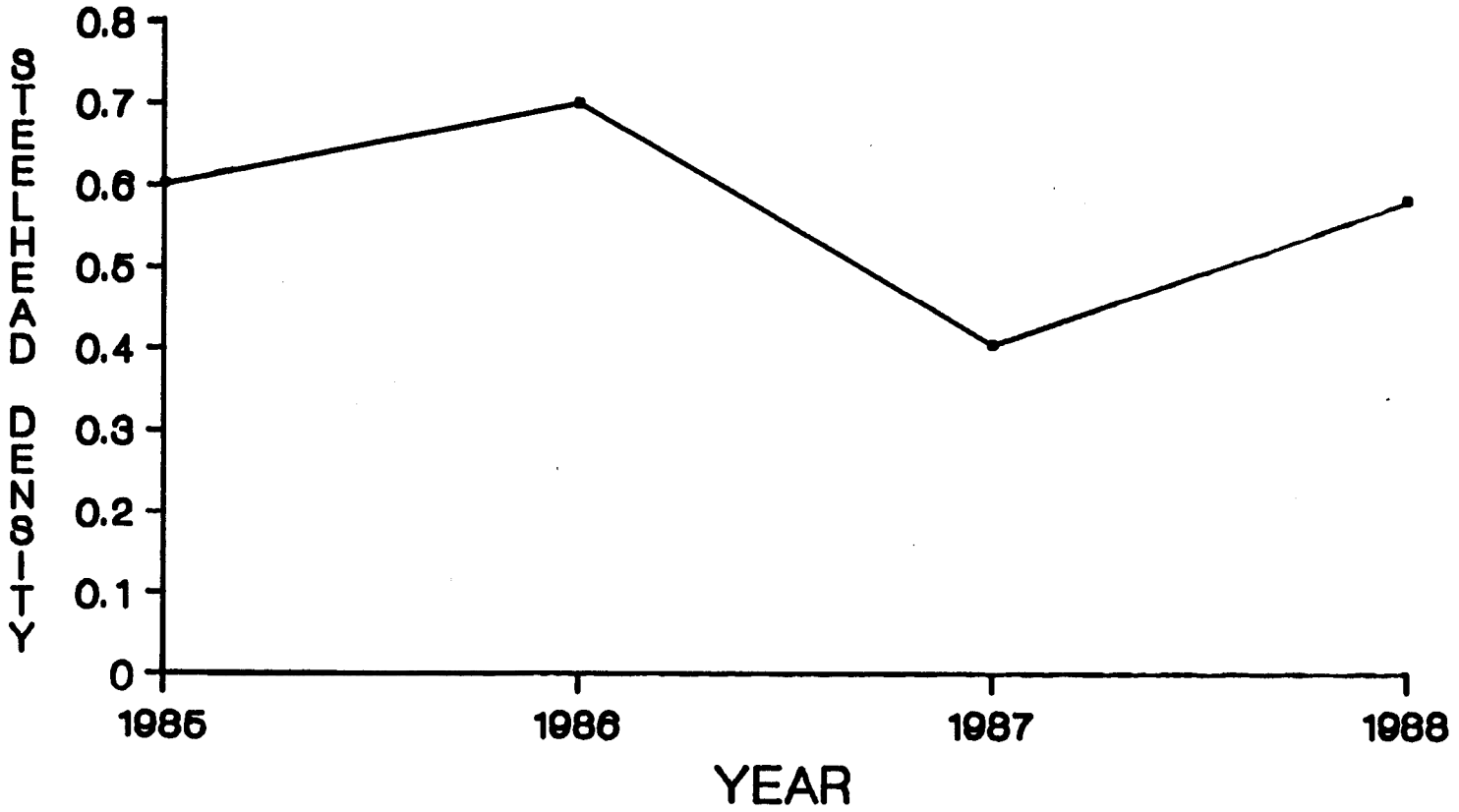

Figure 3. Mean juvenile steelhead densities (fish/100 m^2) MFSR, all transects, 1985-1988.

Table 8. Age composition (Z) of juvenile steelhead observed in the MFSR, 1985-1988.

Age group	Year			
	1985	1986	1987	1988
I	38	26	20	82
II	49	62	67	36
III	12	13	8	2
IV	0	1	0	0

Niehring (1988) determined that young-of-the-year (yoy) survival was negatively correlated to high spring flows. Normally, peak runoff in the MFSR occurs in June, with discharges of 8,000-10,000 cfs. In 1986, peak flow was about 15,000 cfs and in 1987 peak flow was 1,000 cfs. In 1987, we observed a small percentage of age group I fish (20%) which were yoy in 1986. The 1987 year class comprised 82% of the sample observed in 1988 as age class I fish. In 1988, the peak discharge was 3,200 cfs, therefore, if the above hypothesis is valid, the number of age group I fish observed in 1989 should be larger than average.

Another factor that may have helped produce a strong year class in 1987 was a larger return of adult steelhead. The 1987 adult returns were the first progeny of wild adults protected from the sport harvest in Idaho by mandatory catch-and-release regulations. These regulations should have increased the spawning escapement to the MFSR in 1987. This hypothesis should be further substantiated by observing greater numbers of juvenile steelhead in future years. Counting variability alone would not have resulted in the magnitude of increase observed.

The number of cutthroat trout observed declined 45% in 1988, from 375 fish in 1987 to 207 fish in 1988. From 1971 to 1984, cutthroat numbers increased. Since 1984, however, numbers have generally declined (Figure 4). Some factors contributing to the fluctuations are transect area visibility, observer variability, sampling time, and population fluctuations. Prior to 1985, the counts were not converted to densities. Fish/100 m^2 is a better abundance measurement and is more accurate for identifying population variations and trends. Since 1985, the mean density and total fish count have shown similar fluctuations (Figure 5). The area surveyed since 1985 has varied little and averaged 35,257 m^2 (range 31,079-37,818 m^2). The area surveyed in 1988 was only 1.5% less than in 1987 and would not account for a 451 decline in cutthroat numbers.

Not only was there a decline in the total number of fish observed from 1987 to 1988, there was also a 301 decline in cutthroat trout density from 1.0 fish/100 m^2 to 0.7 fish/100 m^2. Densities were still greater than those observed in 1985 (Figure 5).

The decline also affected population size structure. The number of fish longer than 300 mm declined to 15% (Table 9), which was similar to 1971, prior to establishment of catch-and-release regulations. The mean length of cutthroat trout caught by hook and line has generally decreased over the past 10 years (Figure 6). Some of the yearly fluctuations in numbers can be attributed to counting variations between divers, variation in transect area, sampling date (July vs August), potential emigration to cooler tributaries during drought years, as well as actual population fluctuations. The decline in fish over 300 mm may also be affected by illegal harvest and/or hooking mortality. It may take a couple of years to determine if this population shift is a weak year class or a downward population trend.

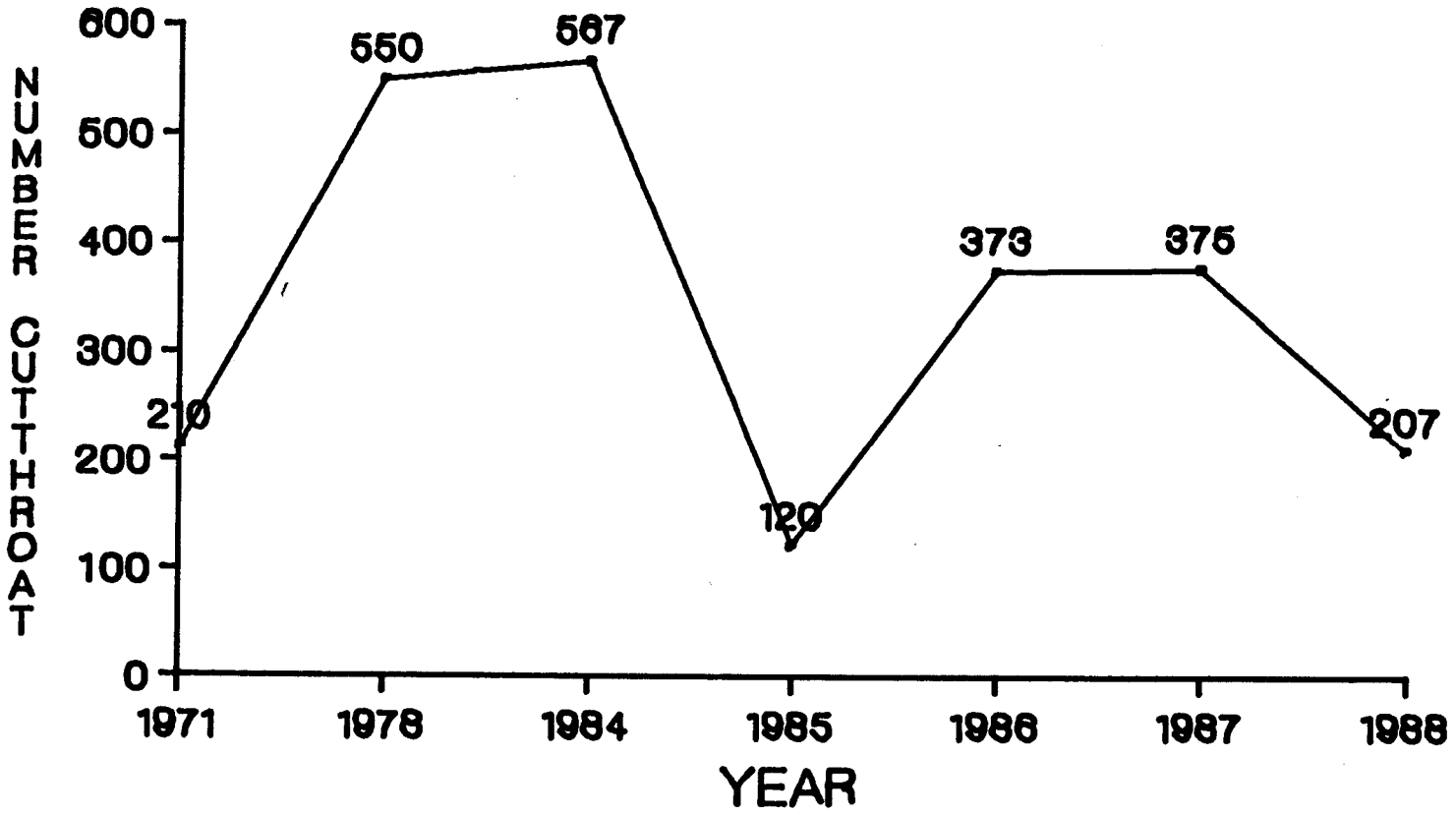

Figure 4. Total number of cutthroat trout counted in MFSR transects, 1971-1988.

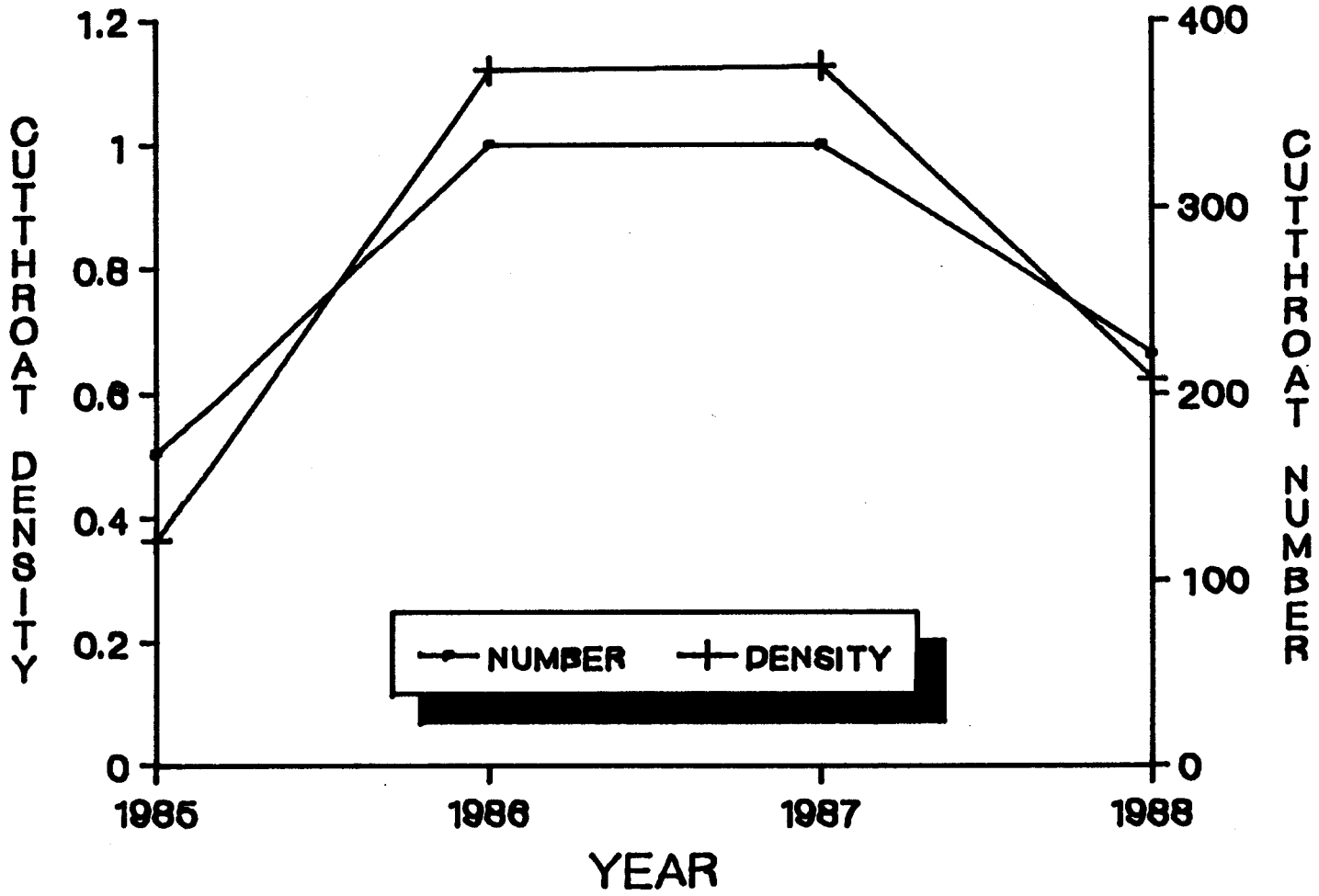

Figure 5. Mean density (fish/100 m^2) and total number of cutthroat trout in MFSR transects, 1985-1988.

Table 9. MFSR cutthroat trout length group composition (%) for 1971-1988.

Year	No.	Lengths (mm)		
		<152	153-304	>305
1971[a]	210	0	87	13
1978[a]	575	1	68	31
1984[a]	58	8	64	26
1985[b]	120	7	59	37
1986[b]	373	0	67	33
1986[a]	287	0	70	30
1987[b]	375	1	58	41
1987[a]	175	1	63	36
1988[b]	207	1	84	15

[a]Transects counted in August.
[b]Transects counted in July.

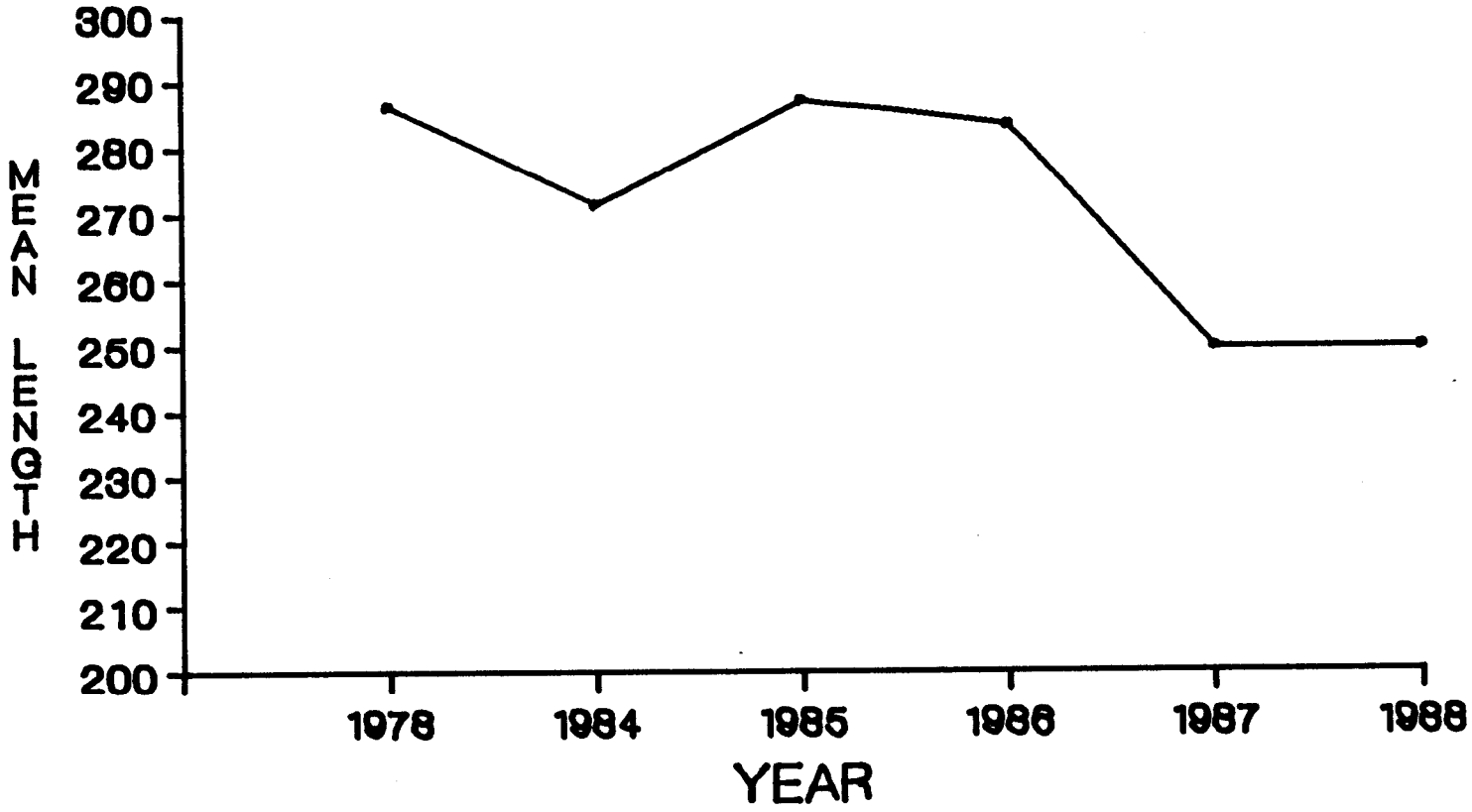

Figure 6. Mean lengths (mm) of cutthroat trout collected by hook and line from the MFSR, 1978-1988.

The number of young cutthroat that recruit from tributaries to the MFSR may increase dramatically due to low runoff in 1987 and 1988. These year classes will not migrate to the MFSR until their second and third years of life, which will be in 1989 and 1990.

The number of juvenile chinook salmon observed in MFSR transects has varied markedly between years (Table 10). Observers have also noted differences between July and August counts, with fewer salmon observed during the early counts. The reasons can probably be attributed to the small size of juvenile chinook salmon, the difficulty observing them in a large river, and timing of emigration from tributaries to the MFSR. These fluctuations have probably masked any actual population trends. The observations should be made in mid-August to obtain more accurate abundance estimates.

Middle Fork Salmon River Tributary Transects

Similar to the trend observed in main MFSR transects, densities of juvenile steelhead in MFSR tributary transects increased from 1987 to 1988 (Figure 7, Table 11). Contrary to the downward trend observed for cutthroat trout in MFSR transects, tributary counts increased slightly from 1987 to 1988. Chinook salmon counts increased considerably, from 4 to 6 fish/ m^2. Late July or August tributary counts may be the best index of chinook salmon abundance in the MFSR drainage. Overall, it would appear that steelhead and cutthroat trout densities in tributaries are relatively stable or slightly declining while chinook salmon densities are increasing. It will probably take several more years of consistent counts to establish meaningful trends, however.

Salmon River Tributary Transects

The ten transects in five Salmon River tributaries were established in 1985, primarily as steelhead transects. Steelhead densities have been increasing since 1985, with the exception of 1988 counts (Figure 8, Table 12). Densities decreased in every transect except Horse Creek #1. This was probably the result of a weak year class.

Chinook salmon densities have generally been low in the surveyed tributaries, but increasing since 1985 (Figure 9).. In 1988, counts decreased in most of the transects with the exception of the Pahsimeroi River. These fish are escapees from Pahsimeroi Hatchery or released smolts which had not migrated. Currently, no adult chinook salmon are released above the hatchery weir to spawn, nor are smolts or fingerlings released above the weir.

Table 10. Juvenile chinook salmon numbers observed in MFSR transects, 1971-1988.

Year	July	August
1971	NC	700+
1978	NC	287
1984	NC	1,269
1985	3	NC
1986	146	369
1987	4	0
1988	45	NC

NC=not counted.

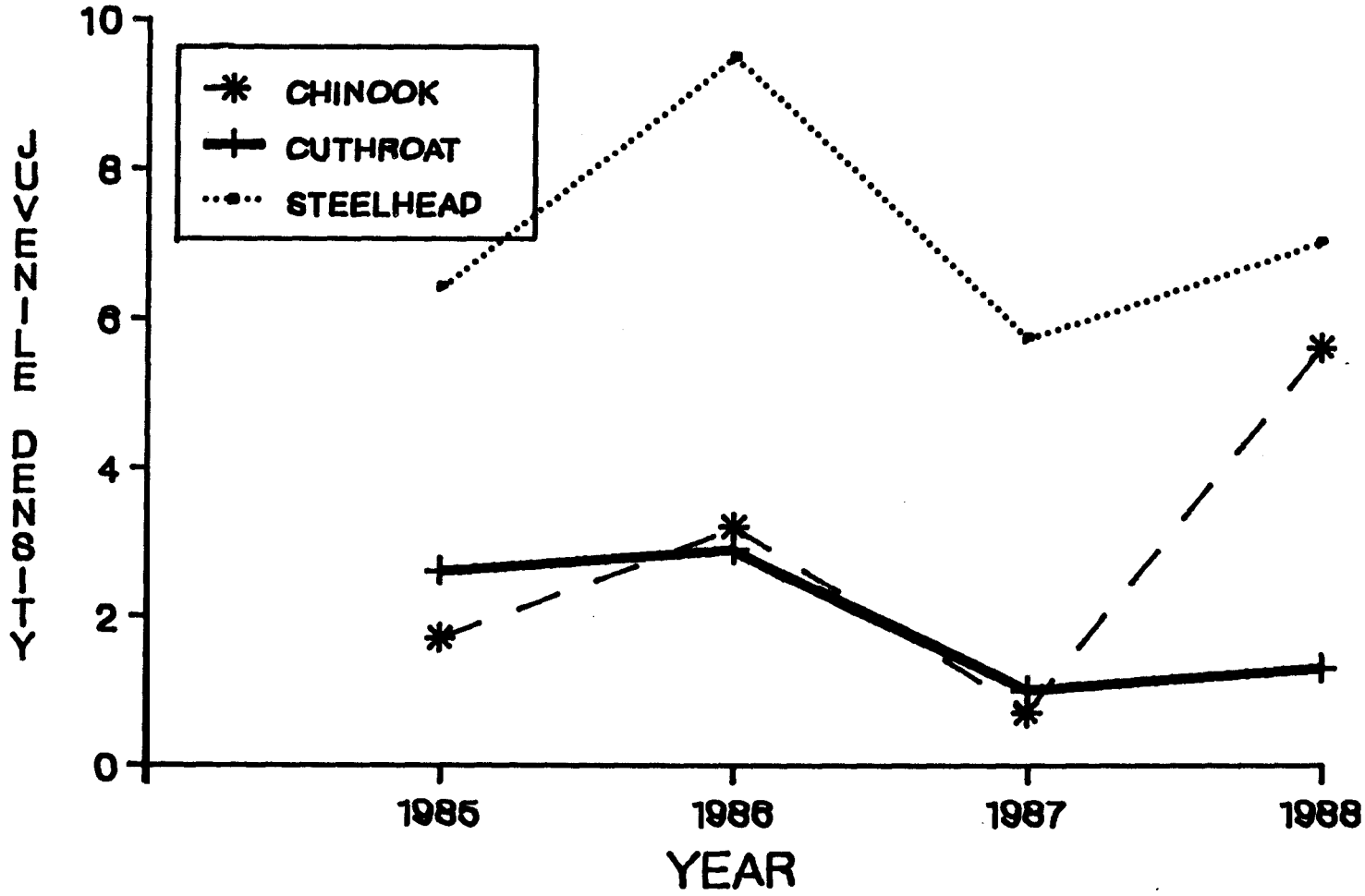

Figure 7. Chinook salmon, cutthroat trout, and steelhead densities (fish/100 m^2) observed in MFSR tributary transects, 1985-1988. All counts were made in July or August.

Table 11. Densities of steelhead, cutthroat trout, and chinook salmon (fish/100 m^2) counted in MFSR tributary transects, 1985-1988.

	Steelhead					Cutthroat					Chinook				
Transect	July 1985	July 1986	June 1987	Aug. 1987	July 1988	July 1985	July 1986	June 1987	Aug. 1987	July 1988	July 1985	July 1986	June 1987	Aug. 1987	July 1988
Pistol Cr. #1	10.3	13.0	2.1	7.1	11.1	1.4	5.5	0.0	1.2	0.6	0.0	3.4	0.0	8.3	15.4
Pistol Cr. #2	4.6	1.2	1.0	2.9	1.3	8.5	3.3	3.9	2.3	0.4	1.3	8.2	0.0	10.3	7.4
Marble Cr. #1	0.8	0.5	0.8	-	1.1	0.2	1.2	0.0	-	0.3	0.0	0.0	0.0	-	0.0
Loon Cr. #1	9.3	21.4	14.3	0.6	16.5	5.5	3.3	1.5	2.5	3.3	8.8	7.7	4.9	0.0	14.3
Loon Cr. #2	5.3	5.1	1.8	1.5	6.0	0.0	0.0	0.2	0.0	0.0	0.0	0.9	0.0	0.0	0.0
Camas Cr. #1	-	2.7	3.3	0.0	6.5	-	1.4	2.1	1.6	3.4	-	0.0	0.0	0.0	2.2
Big Creek #1	8.2	16.8	16.4	1.5	6.6	0.0	2.3	0.3	0.7	1.3	0.0	2.2	0.0	3.3	1.0
Numerical average	6.4	9.5	5.7	2.7	7.0	2.6	2.4	1.1	1.4	1.3	1.7	3.2	0.7	3.7	5.8
Weighted average	5.5	7.4	3.9	2.0	4.6	1.7	1.9	1.0	1.4	1.0	0.9	2.3	0.3	3.8	3.5

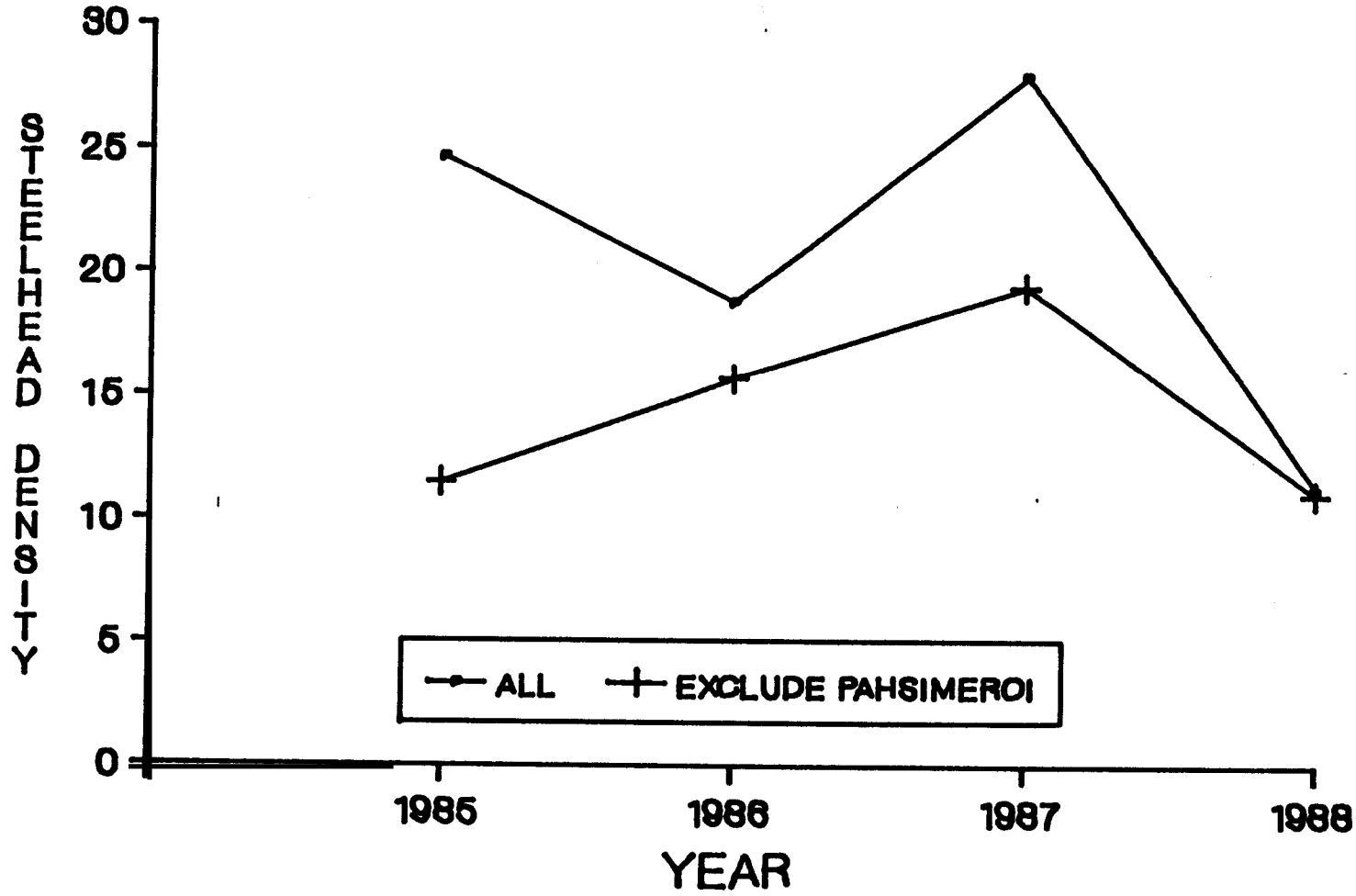

Figure 8. Mean steelhead densities (fish/100 m^2) in Salmon River tributary transects, 1985-1988.

Table 12. Densities of steelhead, cutthroat trout, and chinook salmon (fish/100 m^2) counted in main Salmon River tributary transects, 1985-1988.

Transect	Steelhead				Chinook				Cutthroat			
	1985	1986	1987	1988	1985	1986	1987	1988	1985	1986	1987	1988
Horse Creek #1	20.6	22.5	0.2	13.9	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0
Horse Creek #2	-	14.8	21.3	15.8	0.0	0.0	1.9	0.0	-	0.0	0.5	0.7
Chamberlain Cr. #1	10.6	17.6	32.4	19.3	0.0	0.7	8.5	1.6	0.0	0.0	0.0	0.8
Chamberlain Cr. #2	9.8	17.9	39.1	12.2	0.0	1.1	10.3	1.7	1.2	0.5	1.6	0.3
Bargamin Cr. #1	9.7	10.9	15.3	9.5	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0
Bargamin Cr. #2	6.2	9.4	14.9	8.4	0.0	0.0	0.0	1.5	0.2	0.0	0.5	0.0
Sheep Creek #1	-	4.3	2.3	0.0	-	0.0	0.4	0.0	-	0.0	0.0	3.0
Sheep Creek #2	-	28.4	29.3	8.0	-	0.0	0.0	0.0	-	0.0	0.0	31.0
Pahsimeroi #1	40.6	44.0	86.4	10.0	0.0	5.6	0.0	12.0	0.0	0.0	0.0	0.0
Pahsimeroi #2	74.4	17.6	31.6	14.0	3.2	18.4	2.0	13.9	0.0	0.0	0.0	0.0
Numerical mean	24.6	18.7	27.3	11.1	0.5	2.6	2.3	3.1	0.3	0.1	0.3	3.6
Excluding Pahsimeroi R.	11.4	15.7	19.4	10.9	0	0.2	2.6	0.6	0.4	0.1	0.3	4.5
Weighted mean	25.6	16.5	21.1	11.7	0.6	3.0	1.8	4.0	0.2	0.1	0.2	1.1
Excluding Pahsimeroi R.	12.1	14.6	15.1	11.2	0	0.2	1.8	0.6	0.3	0.1	0.3	1.5

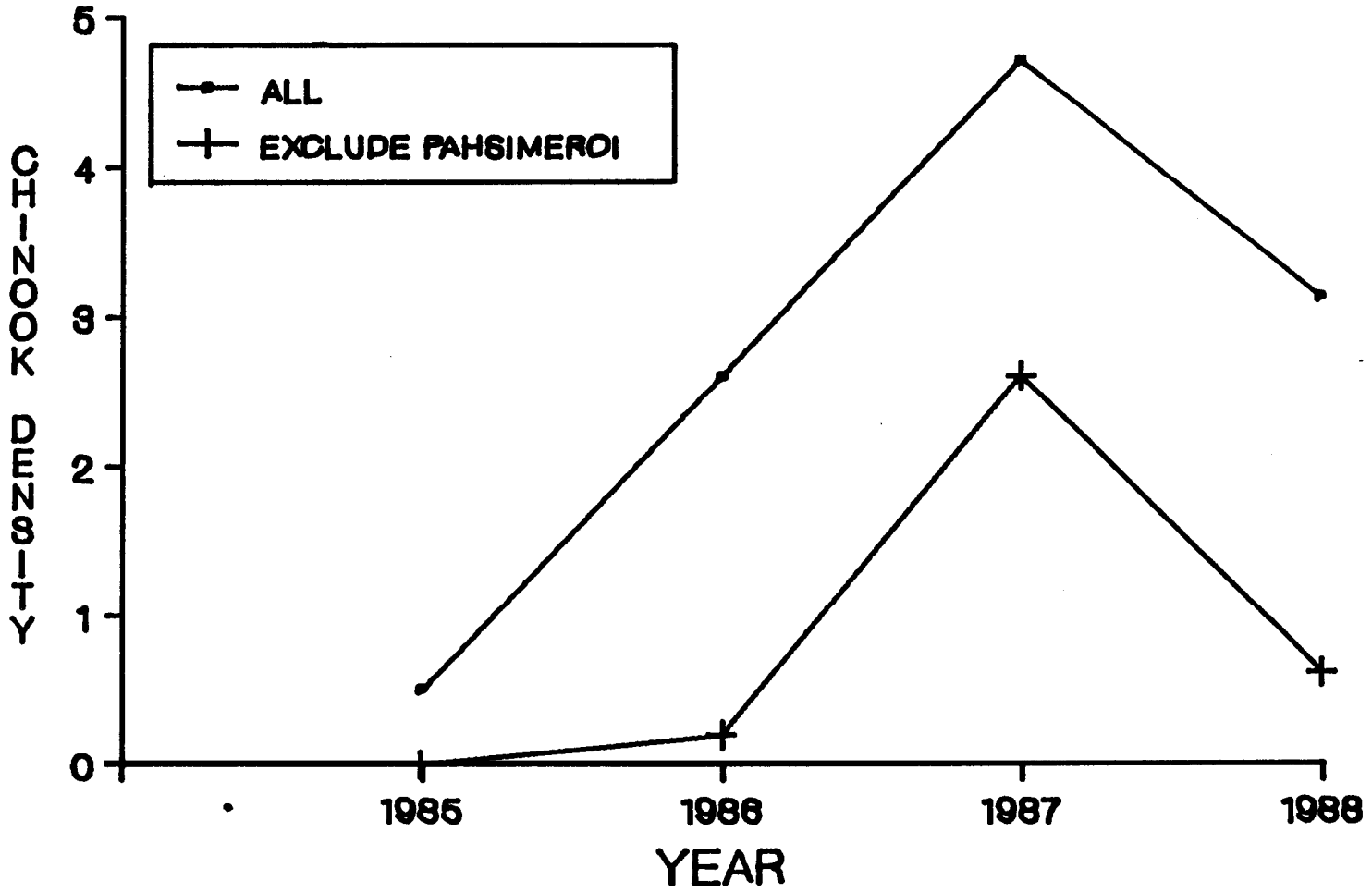

Figure 9. Mean juvenile chinook salmon densities (fish/100 m^2) counted in Salmon River tributary transects, 1985-1988.

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JOB PERFORMANCE REPORT

STATE OF: Idaho **NAME:** REGIONAL FISHERY MANAGEMENT INVESTIGATIONS

PROJECT NO: F-71-R-13 **TITLE:** Salmon Subregion Technical Guidance

JOB NO.: 6(SAL)-d

PERIOD COVERED: July 1, 1988 to June 30, 1989

ABSTRACT

During 1988, technical assistance was provided to all state and federal agencies upon request. Comments were submitted to various agencies and private entities concerning stream alterations, bank stabilizations, mining operations and reclamation plans, fish rearing proposals, private ponds, water withdrawal applications, gravel removal projects, highway reconstruction, bridge replacement, and hydropower-related matters. On-site inspections of proposed, on-going, and completed projects were conducted.

Also, we responded to the general public in person, by telephone, and mail to inquiries about fishing opportunities, techniques, regulations, and area specifics.

Authors:

James A. Davis
Regional Fishery Biologist

James R. Lukens
Regional Fishery Manager

OBJECTIVES

1. To assist the Department of Water Resources, the Department of Lands, the U.S. Army Corps of Engineers and other state, federal, local, and private entities in evaluating the effects of habitat manipulation on fish and fish habitat.

2. To recommend procedures that minimize adverse effects of stream course alterations on aquatic habitat and fish.

3. To provide information on all aspects of fisheries and aquatic habitat as requested.

TECHNIQUES

We responded to all requests for data, expertise, and recommendations from individuals, government agencies, and corporations. Meetings were attended, field inspections conducted, and responses generated as appropriate.

RESULTS

During 1988, we responded in writing to requests for technical assistance or comments on various water- and fishery-related matters as follows:

Agency	Number of requests
U.S. Forest Service	4
Idaho Department of Water Resources	19
Idaho Department of Lands	4
Idaho Department of Transportation	1
U.S. Bureau of Land Management	1
U.S. Army Corps of Engineers	6
U.S. Environmental Protection Agency	1
Shoshone-Bannock Tribes	2
Private and Miscellaneous	10

Telephone communication was the major mode of inter-agency contact. Commonly, we responded to stream alteration proposals by meeting with the applicant on-site, determining the nature of the situation, and sending written comments to the appropriate agency. Due to the remoteness of the Salmon Subregion, we were often the only agency representatives available to conduct on-site inspections.

We advised three individuals concerning fish pond construction.

We responded to numerous inquiries from the public (by telephone, letter, and in person) about when, where, and how to participate in various fisheries in the region, ranging from steelhead angling to high mountain lake fishing.

JOB PERFORMANCE REPORT

STATE OF: Idaho **NAME:** REGIONAL FISHERY MANAGEMENT INVESTIGATIONS

PROJECT NO.: F-71-R-13 **TITLE:** Salmon Subregion Salmon and Steelhead Investigations

JOB NO: 6(SAL)-e

PERIOD COVERED: July 1, 1988 to June 30, 1989

ABSTRACT

Juvenile anadromous density counts were conducted in the Middle Fork Salmon River and Mainstem Salmon River in July and August, 1988. This information is covered in a previous section of this report (see Job 6(SAL)-c^2).

We also conducted annual salmon redd counts in the Marsh Creek drainage, Salmon River, Lemhi River, East Fork Salmon River, and the Yankee Fork Salmon River. This data is included in the annual salmon spawning ground surveys report.

Authors:

James A. Davis
Regional Fishery Biologist

James R. Lukens
Regional Fishery Manager

Submitted by:

James R. Lukens
Regional Fishery Manager

James A. Davis
Regional Fishery Biologist

Approved by:

IDAHO DEPARTMENT OF FISH AND GAME

Jerry M. Conley, Director

Steven M. Huffaker, Chief
Bureau of Fisheries

Al Van Vooren
Resident Fisheries Manager